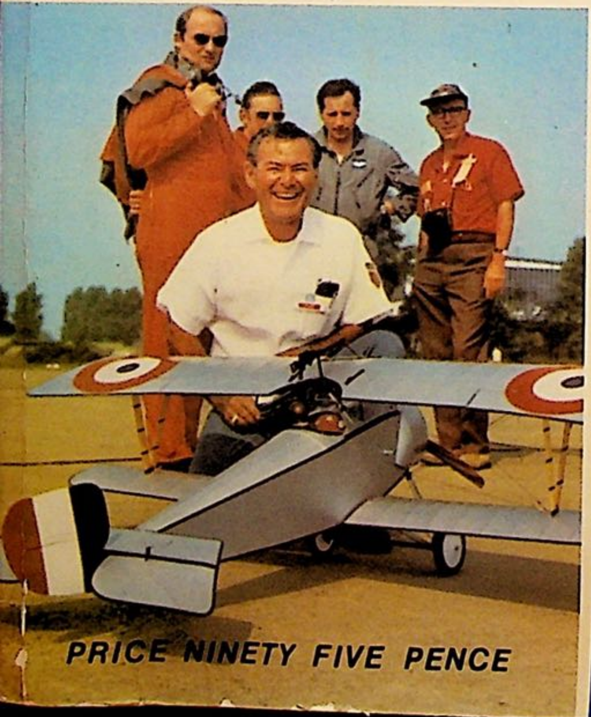
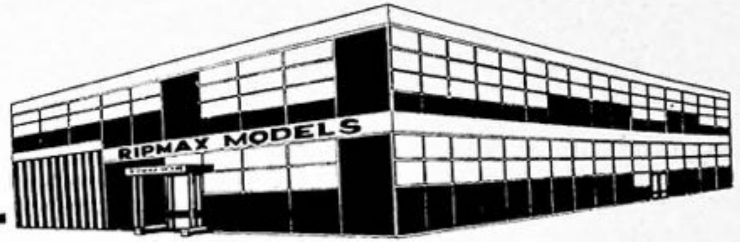
RIPMAX



PRICE NINETY FIVE PENCE

Modellers Handbook

RIPMAX CORNER, ENFIELD, MIDDLESEX

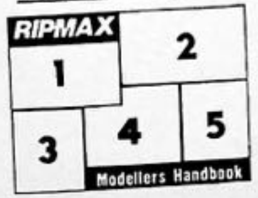


RIPMAX MODELLERS' HANDBOOK

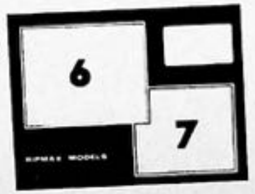
This Handbook has been designed as a 'complete' guide to everyone interested in model aircraft ... model boats ... model cars ... and especially in the radio control of models. In addition to illustrating and describing over 250 models available in kit form ... plus engines, radio control equipment and accessories, etc... there are numerous articles on modelling subjects. Building From Kits, How to Pilot a Model Helicopter, Fitting Out a Model Boat, Flying Control Line Models, How to Select Radio Control Equipment ... and a host of other subjects. Plus 'data' items like Propeller Selection, Metric Conversions, Wire Sizes, Rubber Motor Turns Table, etc., etc...

A Handbook, in fact, which will remain a continuing source of interesting reading and reference ... to all modellers from experts down to the absolute beginner.

PHOTOS ON THE COVER....



1. ADOLPH BERMPOHL Scale Rescue Boat and Daughter Ship
2. HI-FLY Twin Electric powered R/C Sailplane (being launched)
3. Scale R/C Model of W.W.I. Nieuport 17 Biplane
4. Bell 212 Scale R/C Helicopter (World Record Holder)
5. COLLIE R/C Model Yacht with 2-Channel Radio
6. FUTABA 6 RADIO CONTROL EQUIPMENT
7. Selection of GRAUPNER H.B. ENGINES



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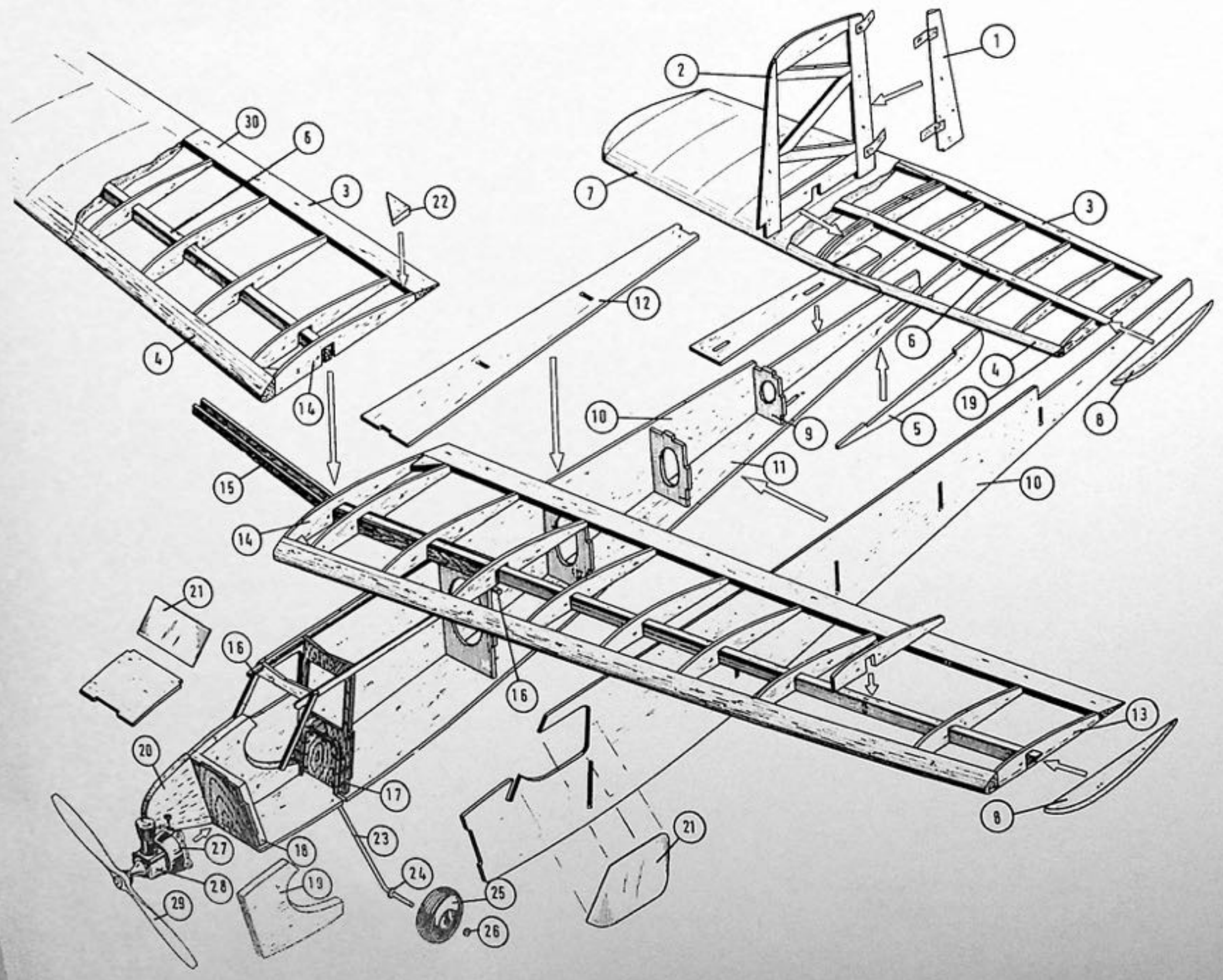
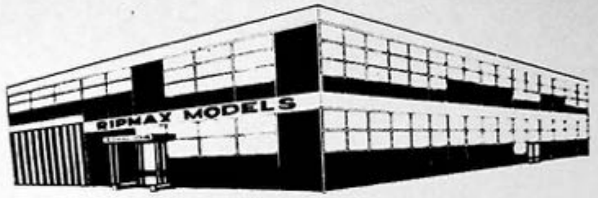
PARTS OF A MODEL AEROPLANE...



KEY TO DRAWING

1. Rudder
2. Tail Fin
3. Trailing Edge
4. Leading Edge
5. Tail Skid
6. Main Spar
7. Tailplane
8. Tailplane or Wing Tip
9. Fuselage Former
10. Fuselage Side
11. Bottom Sheeting
12. Topdeck Sheeting
13. Tip Rib
14. Root Rib
15. Dihedral Brace
16. Wing Dowel
17. Main Fuselage Former
18. Firewall
19. Fuselage Doubler
20. Noseblock
21. Windscreen
22. Gusset
23. Undercarriage Leg
24. Washer
25. Wheel
26. Collett
27. Fuel Tank
28. Engine
29. Propeller
30. Covering



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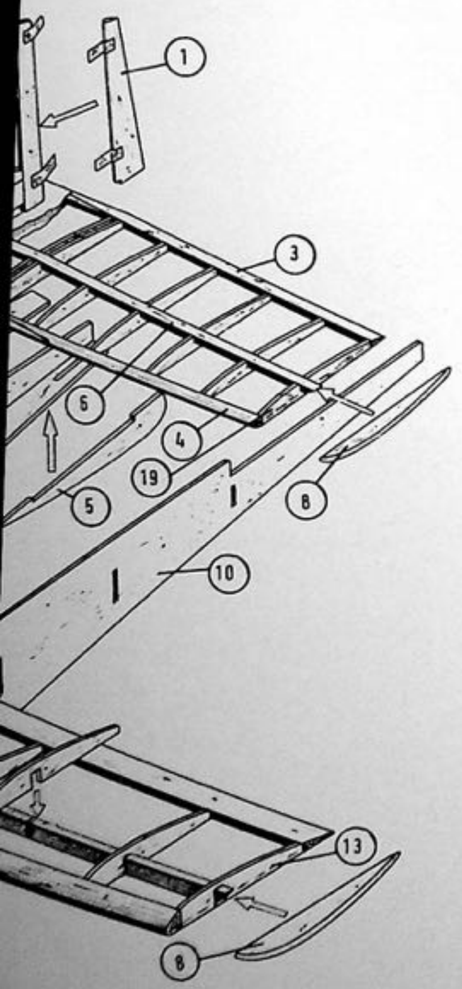

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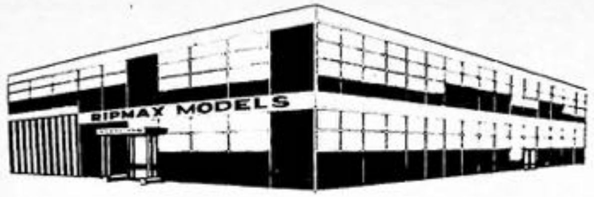

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ABOUT RIPMAX MODELS . . . . .

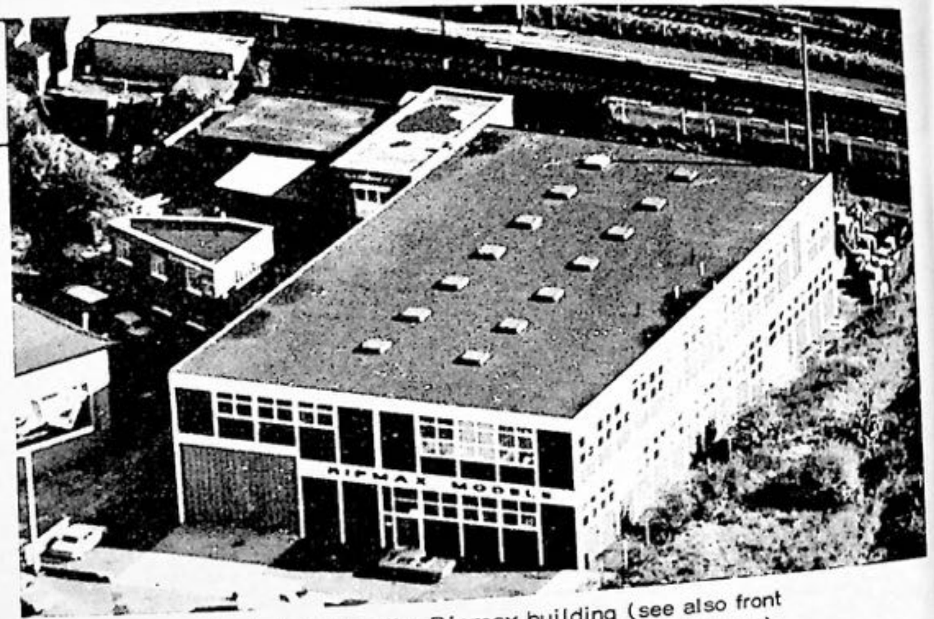
The Company, which recently celebrated its 25th anniversary started in Camden Town in April 1949 and was founded by Charles A. Rippon ("Rip") and Max Coote - hence the name RIPMAX. "Rip" a Fellow and Founder Member of the S.M.A.E. (Society of Model Aeronautical Engineers) who had been in the model trade since its inception in the 20's, teamed up with "Max" to provide a better service for modellers; and today we are particularly proud of the fact that all our technical and managerial staff are keenly interested in some aspect of modelling and have between them over 350 years of modelling experience! It is this extensive expertise that enables us to design and choose the right products because, as modellers, we know what fellow modellers want.

However, the products of one country alone can never cover all modelling requirements so it is also our policy to constantly scour the World Markets to bring to modellers of this country the very best and latest designs of Kits, Radio Control Equipment, Engines and accessories from all over the Globe. Many of these items are specially produced to Ripmax designs or specifications, and all are tested and proven to ensure that the RIPMAX name on any item is the modellers guarantee of quality and satisfaction. In short, we aim to offer modellers the largest and most comprehensive collection of quality modelling products available anywhere in the World.

Looking back through our "history" there are not only numerous outstanding achievements but also many famous firsts which have made life both easier and more enjoyable for the modeller and have opened up new forms of modelling. Marine items were the initial interest when original designs and exclusive productions included the first Flexible Couplings - Balanced Marine rudders - Clip-In fuel tanks and Silencers - Engine Marine Conversions - Steering Units and pulse control boxes for progressive steering by radio. Ripmax introduced the first sealed receiver single channel radio control sets (Pathfinder) - the first 15cc 4-stroke aero/marine engine (Gannet) - the first full range of propeller shafts and tubes - and the first nylon marine propellers. Many of these and other early items are still standard production, proving they were right from the start.

Ripmax have always been in the forefront of Radio Control with such famous names as MacGregor Grundig and Futaba, and were the first to introduce ready-to-go plug together equipment, which immediately simplified installation and made radio practical for the beginner to modelling. Another break through was V-Max solid fuel which made jet flight possible at one penny per flight, whilst our ELECTRA Kit in 1962 was the first electric powered free flight model to be made available to modellers in the world.

More recently we were the first to introduce film covering (MonoKote) which has now become standard practice for most types of models and ready finished foam plastic cored wings, as featured in the Ripmax-Aviette kits, both making building easier and quicker.



Aerial view of the Ripmax building (see also front inside cover); and ground level view (below left).

Fully fuelproof dopes in the widest possible range of colours (Aerogloss) and a genuine 5-minute epoxy adhesive (Devcon) are also Ripmax firsts which have greatly simplified building and finishing, and have made instant field repairs possible. Radio controlled Helicopters, virtually unheard of in this country until demonstrated and distributed by Ripmax, are yet another example of our pioneering; and modelling history was made in July 1974 when we achieved the First channel crossing by R/C Helicopter.

In 1972 we moved to our new modern building at Enfield which enabled us to reorganise and make separate departments for all aspects, including engine testing and repairs, kit design and product evaluation, drawing office and graphic arts section, printing and showrooms (open to trade customers only) all under one roof. Here, using specially designed storage and despatch systems, are a staff of more than 60 all dedicated to providing model shops and modellers with the goods and service they want.

We trust this handbook will help to bring you more enjoyment from your hobby.

SPECIAL NOTE - with restricted space available it is impossible to do full justice to illustrating and describing many of the 300 models included. So ... ask your local model shop to show you the kits you find of particular interest as there is no substitute for seeing the real thing for yourself.

RIPMAX

One of the kit alleys showing storage racks for a few of our 300 models.

Drawing office and process camera are part of our graphic art and printing facility.

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One of our
parts and spar

Aerial view of the Ripmax building (see also front inside cover); and ground level view (below left).

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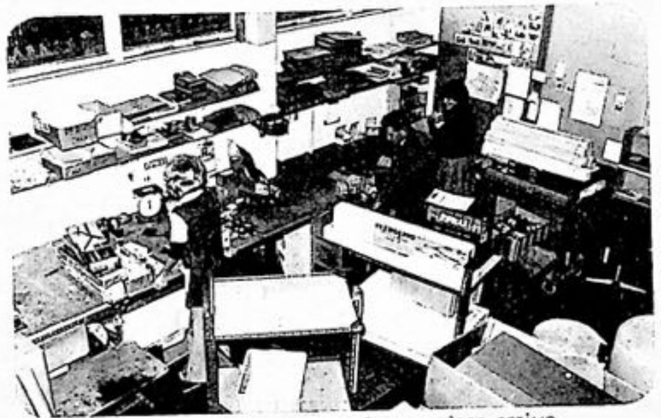
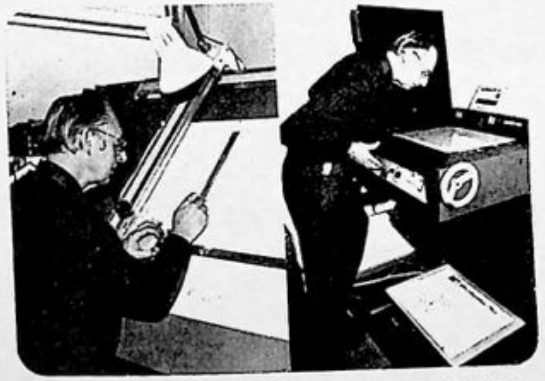


Corner of packing room where orders arrive on collation trollies after a 1/3rd mile trip.

Goods reception and loading bay helps speed deliveries to our many stockists.



Drawing office and process camera are part of our graphic art and printing facility.

One of our accessory alleys where some 5,000 parts and spares each have their own bin for storage.

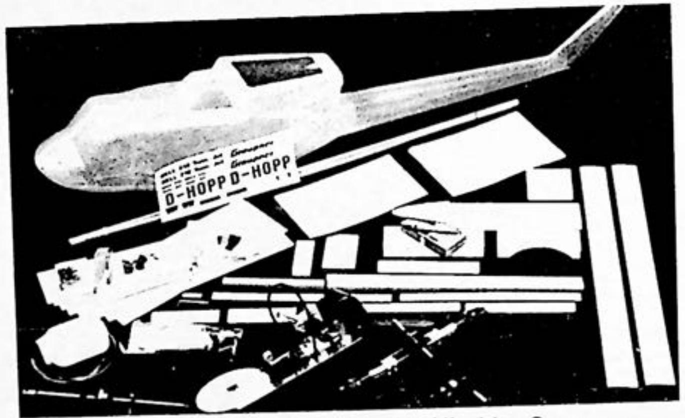
Part of the balsa and obechi store with enough wood to build 10,000 models.

KITS HAVE CHARACTERS

All modern kits are usually described as 'prefabricated' - meaning that they include die-cut and/or preshaped parts, etc. But the degree of prefabrication can vary a lot. Individual manufacturers have their own ideas on what modern prefabrication means - as well as their own ideas on kit model design and on the types of models which appeal.

So ... kits from different manufacturers have different characteristics - as you soon discover when you start building them

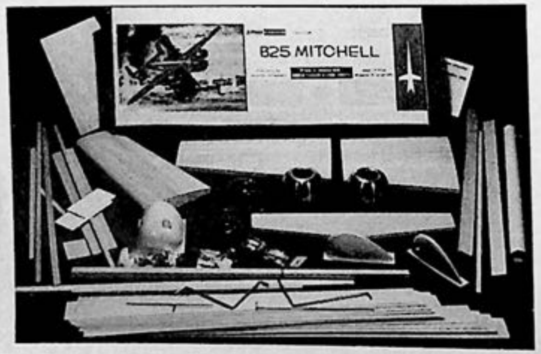
Here are some details of the 'characters' of the world's finest model kits - exclusive to RIPMAX (for UK distribution).

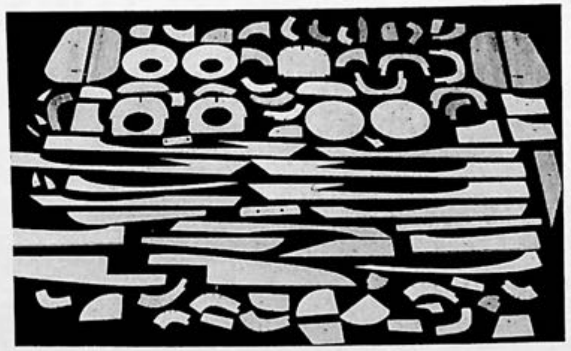


With de luxe kits - like those typified by Graupner productions - the trend is to introduce plastic mouldings for major components, as well as shaped and formed wood parts, etc.. In the case of helicopters the kit also becomes something of a model engineering masterpiece as well, with a full set of precision made mechanical parts.

AVIETTE

British made kits - strong and designed for simplicity of construction and quick building. Foam plastic wings ready-shaped to correct aerofoil section cut assembly to a minimum.





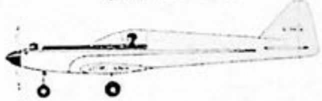
In the case of the Mitchell kit, two separate photos are needed to show all the parts! Note the extensive range of pre-shaped wood parts - metal engine cowlings, shaped landing gear legs, plastic fairings, etc. etc., plus, of course, styrofoam wing panels.

Graupner

These are true DE LUXE quality kits, most of the later models featuring 'mixed' construction. Fuselage shells moulded in grp or high strength plastic... foam wings already balsa-veneered... plus really accurately die-cut or preshaped wood parts. Meticulous attention to detail.

Another major feature of Graupner kits is their COMPLETENESS ... down to wheels (where applicable), adhesives, decals. Plus super-detailed plans and separate overlay plan showing R/C installation (where applicable).

MICK REEVES models



Designed and produced by a WORLD CHAMPION modeller (both in R/C and control line), with extensive use of preshaped parts to give step-by-step assembly. That ensures quick - and accurate - building. Each kit is virtually custom made - that means personal attention by the designer himself. Kits which really give you the performance you are after. Easy-to-follow pictorial step-by-step assembly instructions - so you can hardly go wrong.

Sterling MODELS

Exciting and interesting models kitted in the modern American manner... with a very wide choice of type and size, especially in scale.

The majority of STERLING kits follow 'traditional' construction with die-cut balsa parts and tissue covering - except for the larger, more specialised R/C models.

The range covers just about every type of model you could be interested in from small rubber powered flying scale (convertible to C/L or power) to exhibition standard R/C or C/L scale. Plus a range of freelance designs.

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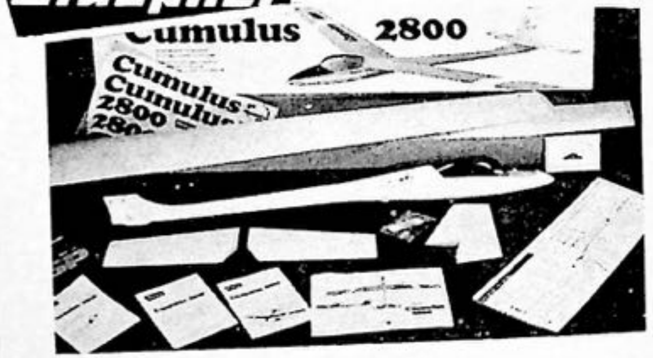

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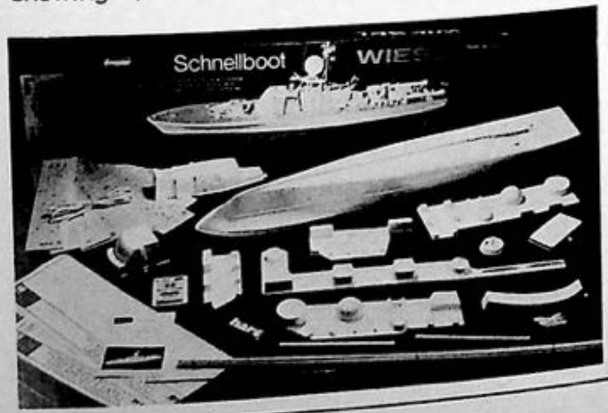

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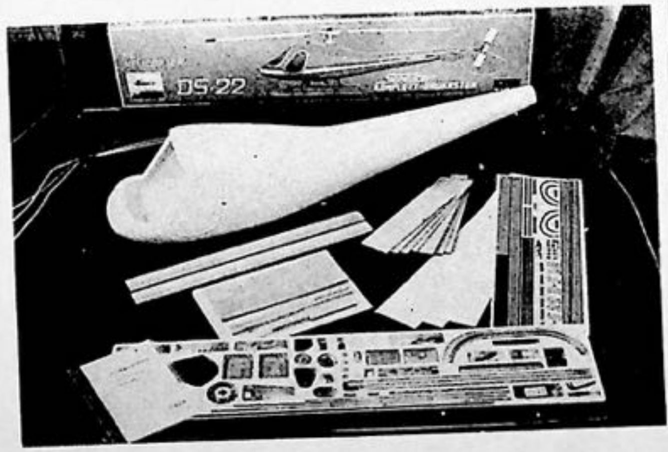
SCHUCO

This range of German kits introduces varied methods of construction, making the best use of modern materials - fibreglass, moulded plastics, etc, with balsa, etc.

The range of aircraft covered offers a number of unusual and attractive subjects - including two helicopters. The boat kits, too, will have a special appeal to marine enthusiasts.



TOP FLITE

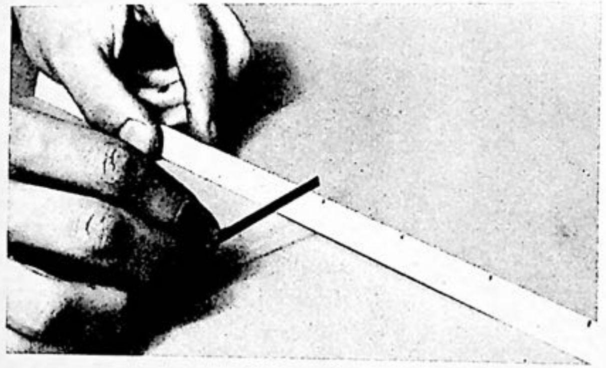
For years the American TOPFLITE kits have been acclaimed for their original ideas on kits prefabrication and accuracy of die-cut parts - with designs produced by top American contest modellers. Scale enthusiasts will also appreciate the fabulous detail incorporated in TOPFLITE R/C scale models.

Recently this range of kits has been expanded to include a number of smaller control line and free flight models - ideal for beginners or juniors.

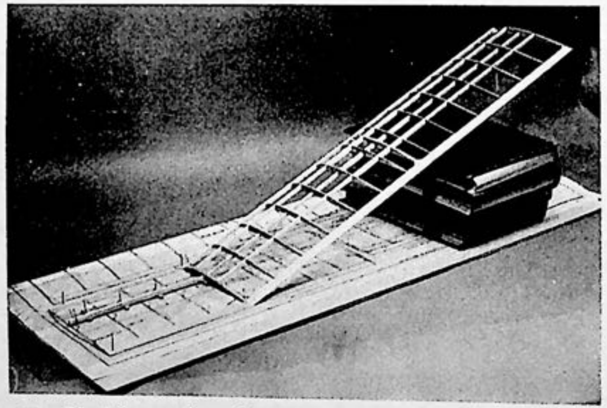
CARL GOLDBERG

Production of each kit is personally supervised by the old maestro (Carl Goldberg) himself - and he is very fussy about the quality of the balsa used. All kits are of balsa construction, extensively (and accurately) die-cut or preshaped (even to notched leading and trailing edges). Many of the designs, too, are 'timeless' - sons are building models their fathers enjoyed more than a decade ago. Proof of classic designs!

BUILDING TIPS

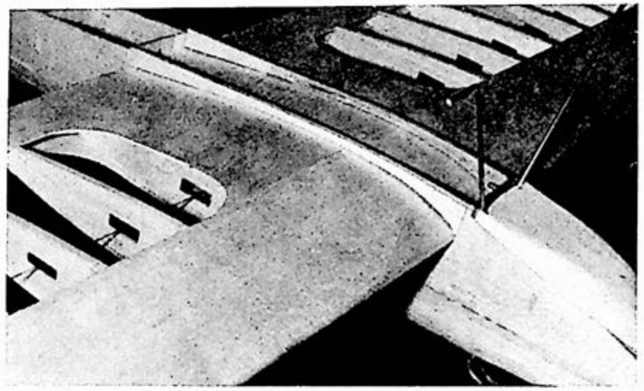


1 Using a small Ripmax needle-file to cut slots in the trailing edges for wing ribs. Choose a file which gives the same width cut as the rib itself. Take care not to cut too deep a notch. Each notch should be the same depth.

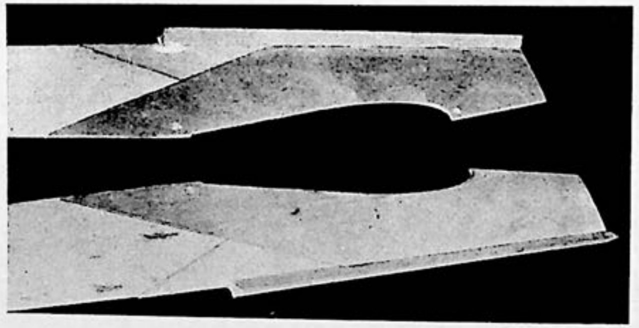


2 Packing up the wing centre-section while building the tip of a glider means that the dihedral angle is built in accurately. Note too how the main spar of the tip is supported on packing pieces to allow for the undercambered wing section.

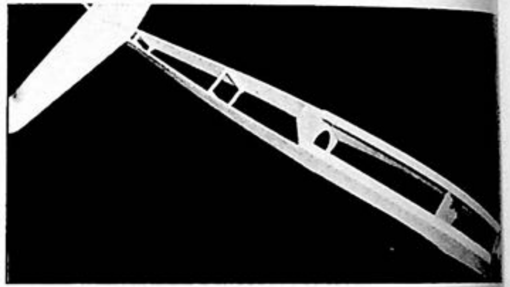
These photographs show typical techniques used in building model aircraft. Only simple tools are required throughout - but choose the right ones for the job.



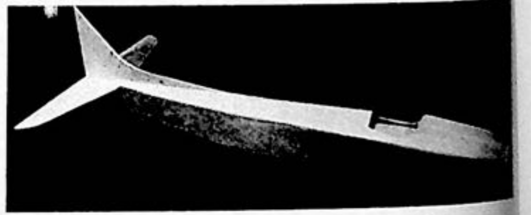
3 Control line models are usually built as three separate units (wings, tail and fuselage) and are then joined together. The most common method of adding the wings to the fuselage is to cut away the fuselage sides under the wing position, install the wing, then glue these pieces back in position before the underside of the fuselage is covered with sheet balsa.



4 When adding plywood fuselage doublers, the best adhesive to use is an 'impact' adhesive, although care must be taken to ensure that the pieces are aligned correctly as the glue sets instantly. However, some modern impact adhesives allow a little re-positioning before the adhesive 'takes' - a good advantage.



5 The Ripmax Gangster, like most R/C designs, is based around a 'box' section fuselage which is then made more attractive by a built up fuselage top decking. This basic fuselage was built inverted to take advantage of the flat top section.

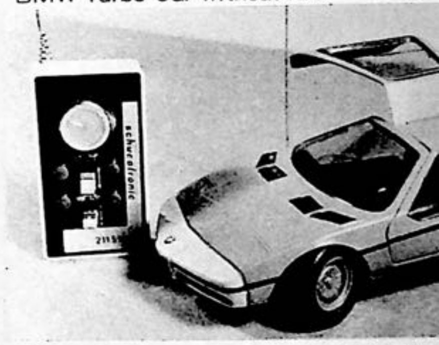


6 Topflite Contender is another R/C model to make use of the basic box form of construction, with sheeted top deck areas which give it its characteristic appearance. Completed Topflite Contender (below) has very attractive appearance, yet is extremely quick to build, and has excellent flying characteristics.

BMW CAR WITH DIGITA

13½" long (1/12th scale) model BMW T
and yellow with green tinted windows an
Two electric motors (one for steering, on
R/C outfit is the SCHUCOTRONIC 2, giv
steering and forward/reverse drive.

BMW Turbo Car with Digital R/C -
BMW Turbo Car without R/C -



CHRISTINA CRUISER

16" long all plastic model - unsi
motors. MATCHING 4-channel
control via two lever switches (
transistorised transmitter and rec
Ripmax guarantee! Supplied
CHRISTINA with SCHUCOTRONIC

sually built as three
and fuselage) and
The most common
to the fuselage is
des under the wing
en glue these pieces
he underside of the
sheet balsa.

uselage doublers, the
an 'impact' adhesive,
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some modern impact
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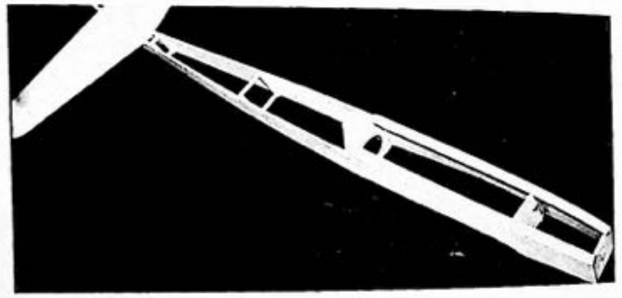
- a good advantage.



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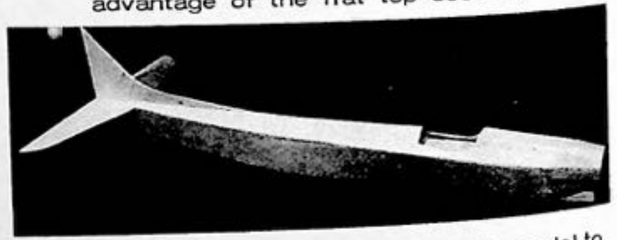

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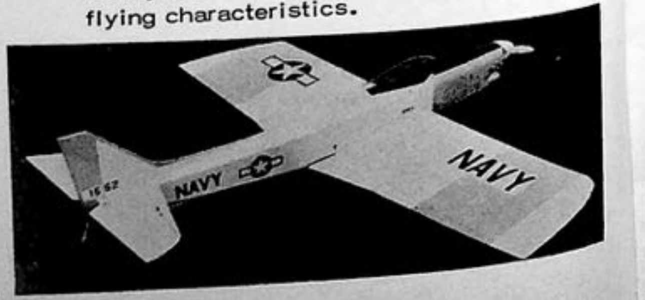
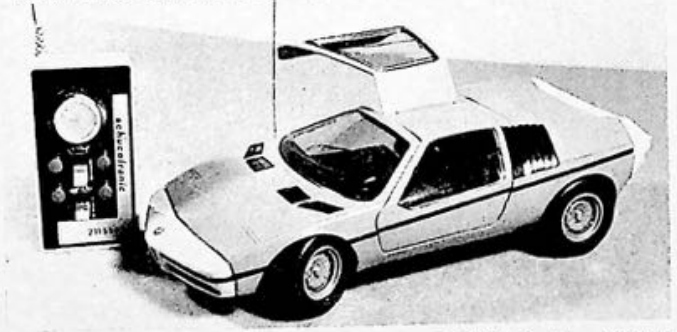


READY-TO-GO MODELS

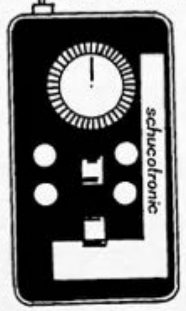
BMW CAR WITH DIGITAL R/C

13½" long (1/12th scale) model BMW Turbo car in smart red and yellow with green tinted windows and rubber tyred wheels. Two electric motors (one for steering, one for drive). Matching R/C outfit is the SCHUCOTRONIC 2, giving PROPORTIONAL steering and forward/reverse drive.

BMW Turbo Car with Digital R/C	- cat no	A-U351/251
BMW Turbo Car without R/C	- cat no	A-U351/252



Modern all-transistor 2-channel digital Tx-Rx'combo' specially developed to match SCHUCO BMW car and AMBASSADOR cruiser. Wheel steering for car. Pressbutton steering for boat. NOT sold separately.



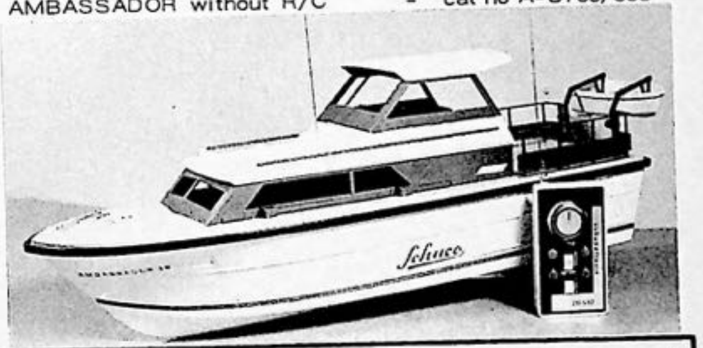
Schuco

37 transistors.
9 volt battery.
Receiver can be removed to transfer from one model to another.

AMBASSADOR CRUISER WITH DIGITAL R/C

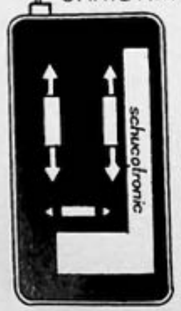
Completely finished scale cruiser 25½" long, 9" beam, with TWO electric motors. Steering is by switching motors together or independently. Forward, stop and reverse control on both motors. Range 100 metres. Hull and superstructure all-plastic construction. Model is ready to go.

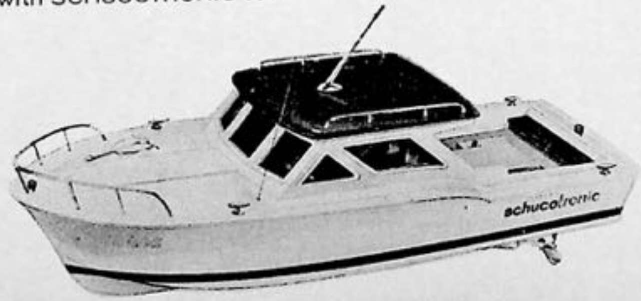
AMBASSADOR with Digital R/C	-	cat no A-U763/382
AMBASSADOR without R/C	-	cat no A-U763/383



CHRISTINA CRUISER WITH 4 CHANNEL R/C

16" long all plastic model - unsinkable! - with twin electric driven motors. MATCHING 4-channel receiver installed gives full steering control via two lever switches (also stop-start either motor). Fully transistorised transmitter and receiver circuits (37 transistors). Ripmax guarantee! Supplied complete ready-to-go.
CHRISTINA with SCHUCOTRONIC receiver combo - cat no A-U763/385

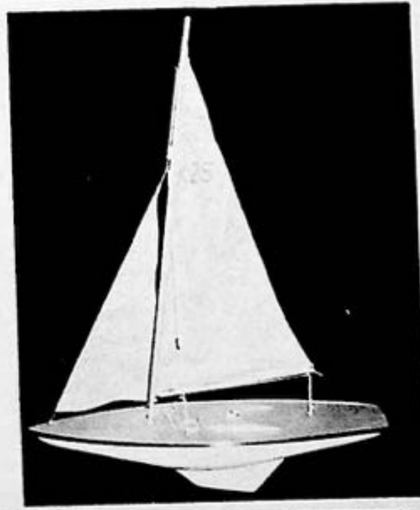




MODEL AVIONICS YACHTS

The proven 'K' class of model yachts, renowned for their fine sailing performances. Moulded plastic hull with single keel and built-in keel weight. Wood deck with simulated planking. Auto-steering. Complete with mast spars, all rigging, etc. and ply stand. Nothing else to buy. In three sizes - ready to go.

K20 - 20" long - cat no A-MAV3
K25 - 25" long - cat no A-MAV4
K30 - 30" long - cat no A-MAV5



AIRCRAFT KITS
RIPMAX-AVIETTE

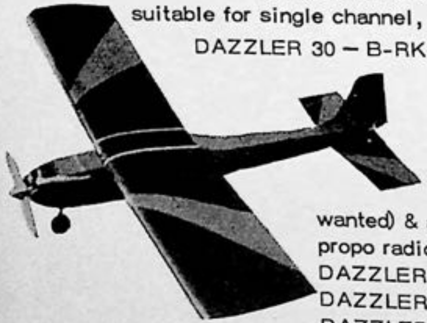
RIPMAX

RIPMAX-DAZZLERS

DAZZLER 30 for .049-.09 engines
DAZZLER 36 for .09 -.15 "
DAZZLER 42 for .09 -.19 "

SIX GREAT R/C sports/trainers in this series. The 30", 36" & 42" span models do not have elevators & ailerons as standard (but these can be fitted) and are suitable for single channel, or single or 1 + 1 proportional.

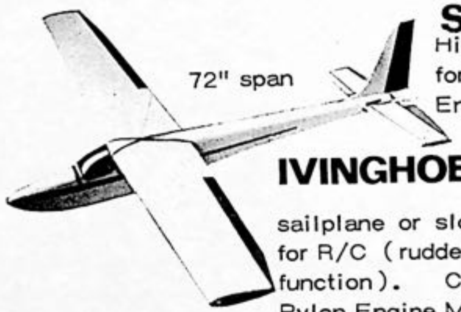
DAZZLER 30 – B-RK20: DAZZLER 36 – B-RK21
DAZZLER 42 – B-RK25



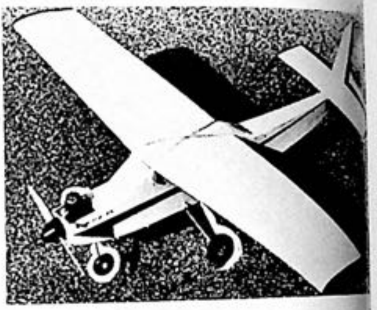
The 48", 54" & 63" DAZZLERS have rudder, elevator, strip ailerons (which can be fixed if not wanted) & are suitable for 4-function propo radio upwards. Tricycle u/c.

DAZZLER 48 (.15-.35 engines) B-RK22
DAZZLER 54 (.29-.45 engines) B-RK23
DAZZLER 63 (.35-.60 engines) B-RK24

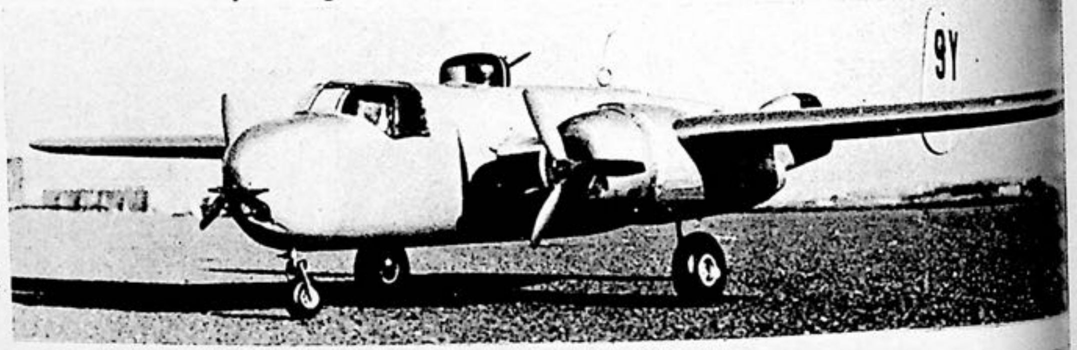
All AVIETTE KITS feature veneer covered Styro-Tru wings, ready to join, plus pre-cut and numbered balsa and ply parts, fully detailed plan and complete building instructions. Also (as applicable to the particular model) the kits contain pre-shaped and brazed wire parts, special wheels, spun aluminium cowlings, engine mounts, hardware, fibreglass tape, control horns, etc.



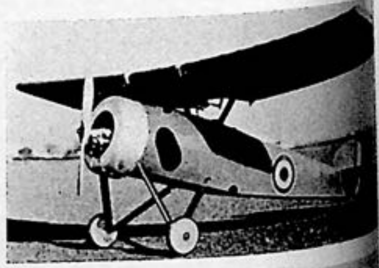
SENATOR 52" span. High wing trainer. Suitable for proportional radio. Engines .15 - .35. cat no - B-RK30



IVINGHOE Fully aerobatic general purpose sailplane or slope soarer. Ideal for R/C (rudder only or multi-function). Cat no B-RK300. Pylon Engine Mount B-RK300/4.

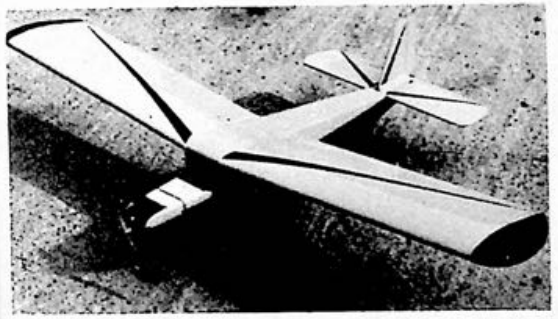


MITCHELL sports scale model. 74" span; twin .29 engines; full house control. Cat no B-RK480.
SOPWITH SWALLOW scale type sports model, 53" span, controls and motors as Eindecker. Cat no B-RK402.
NIEUPORT 17 sports/scale biplane, 51" span; controls and motors as Eindecker. Cat no B-RK401.
EINDECKER scale type sports flier, 56" span; 19-.49 engines; rudder only or rudder / elevator / motor control. Cat no B-RK400.



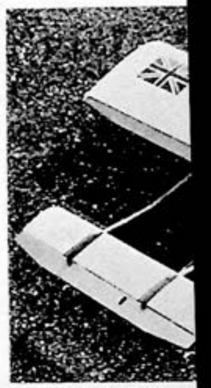
RIPMAX

R/C TRAINERS

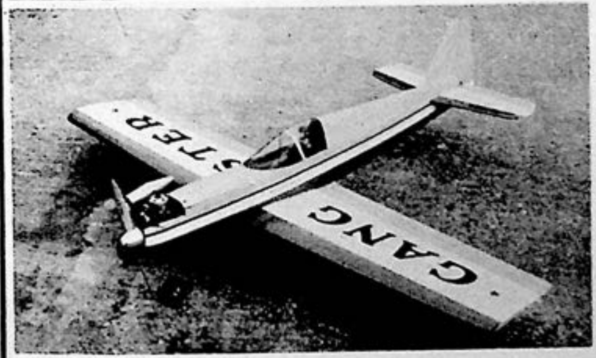


These rugged, easy-to-assemble R/C trainers are available in two sizes (48" and 60" span for .19 to .49 engines).... each in two versions BASIC and FULLHOUSE.
BASIC TRAINERS have parts for rudder and elevator control only. FULLHOUSE TRAINERS have movable rudder, elevators and ailerons.

48" BASIC MINI-TRAINER cat no	B-RK101
48" FULLHOUSE MINI-TRAINER	B-RK102
60" BASIC TRAINER	B-RK111
60" FULLHOUSE TRAINER	B-RK112



A NEW and EXC
Fast to build.
construction. K
foam wing, gla
parts, nuts,
36" span for .
radio.



GANGSTER 52 cat no B-RK200
Wings B-RK200/1 Canopy B-RK201/2

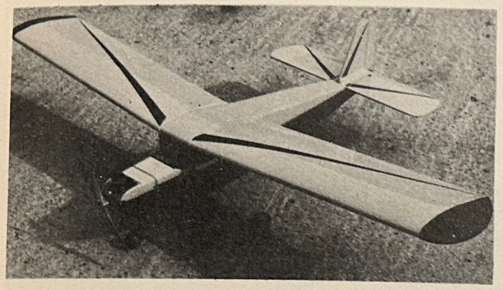
RIPMAX

Designed right from
pilot response ... p
veneered foam plast
parts pre-cut, canop
engine mounts, etc.
GANGSTER 52" (52
and is designed for
Flying weight up to
GANGSTER 63 (63"
and is designed for
Flying weight from

RIPMAX

RIPMAX-AVIETTE
MICK REEVES

R/C TRAINERS



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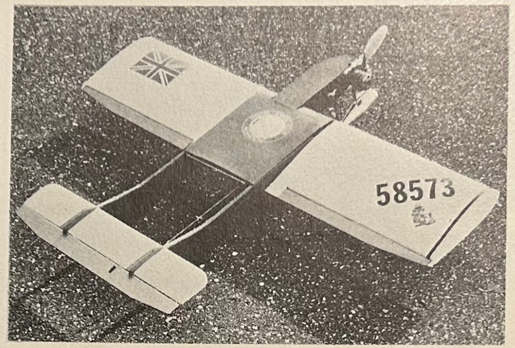
BASIC TRAINERS have parts for rudder and elevator control only. FULLHOUSE TRAINERS have movable rudder, elevators and ailerons.

48" BASIC MINI-TRAINER cat no	B-RK101
48" FULLHOUSE MINI-TRAINER	B-RK102
60" BASIC TRAINER	B-RK111
60" FULLHOUSE TRAINER	B-RK112

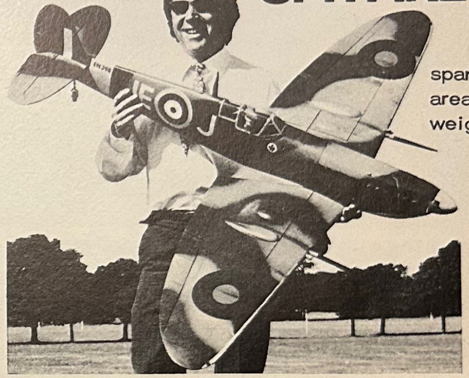
R/C COMBAT!



DINGBAT

A NEW and EXCITING design for R/C COMBAT! Fast to build. Fast to fly. Really tough construction. Kit contains StyroTrue veneered foam wing, glass fibre tape, all balsa and ply parts, nuts, bolts, control horns. 36" span for .19-.40 engines and 3-function radio. cat no B-RK60.

SPITFIRE

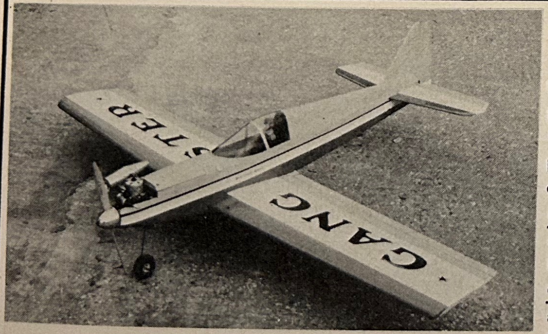


span 63"
area 700 sq in
weight 6-7 lbs

The Americans call it 'stand-off-scale' - models with authentic appearance, but with built-in flyability. A really outstanding example ... Plus EASY TO ASSEMBLE FEATURES. Ready-veneered foam wings, all balsa and ply parts cut, formed undercart, nylon and other hardware, horns, engine mount, giant-size decals, etc., etc. Suitable for .40 to .61 engines. Step-by-step assembly plan. Cat no B-RK202

Wings only B-RK202/1 Canopy only B-RK202/2

RIPMAX GANGSTERS...

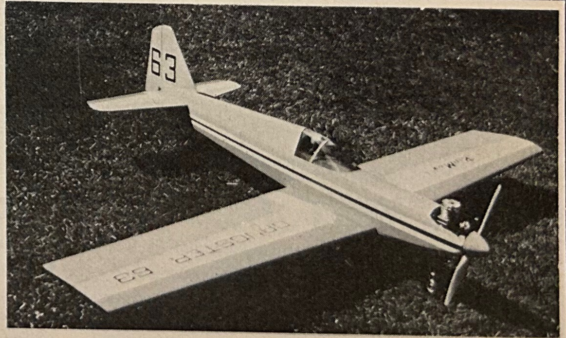


GANGSTER 52 cat no B-RK200
Wings B-RK200/1 Canopy B-RK201/2

Designed right from the start for flyability and superb pilot response ... plus easy building. Each kit includes veneered foam plastic wing panels, all balsa and ply parts pre-cut, canopy, tank, formed undercart, nylon engine mounts, etc. and step-by-step assembly plan.

GANGSTER 52" (52" span) has a wing area of 500sq. in. and is designed for powering with .29 to .40 engines. Flying weight up to 5 lbs.

GANGSTER 63 (63" span) has a wing area of 690sq. in. and is designed for powering with .40 to .61 engines. Flying weight from 5½ lbs.



GANGSTER 63 cat no B-RK201
Wings B-RK201/1 Canopy B-RK201/2

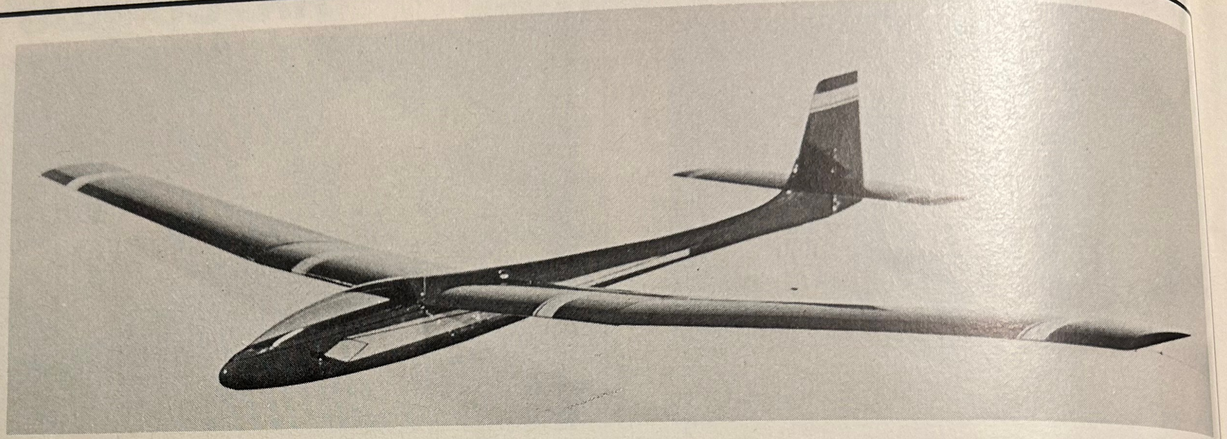
AVIETTE QUEST

AVIETTE "LONGMAN"

Latest addition to the Ripmax-Aviette 'KWIK-BUILD' range. This is a giant size de luxe sailplane designed for easy assembly - and realistic appearance. Equally suitable for slope soaring or thermal flying and superbly responsive to control. Fly with rudder/elevator or rudder/elevator/aileron.

Weight 4½ lbs with radio, span 109", wing area 830 sq ins, wing loading 12½ ozs per sq ft. Kit includes styrofoam wings, shaped wood parts, hardware, etc.

Cat No. B-RK370



the QUEST HUSTLER

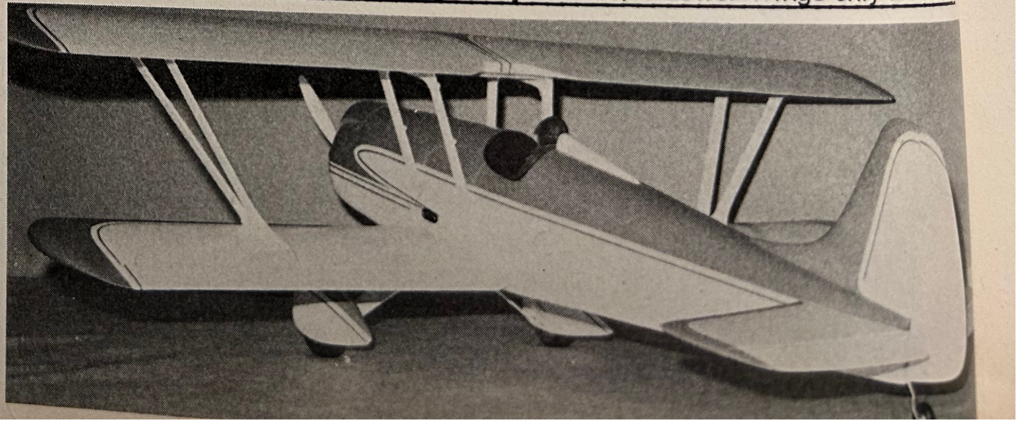
Cat no B-Q70

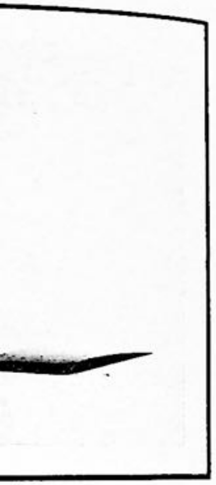
54" span R/C sports/aerobatic model in the latest sleek, modern style matching .40 engines. The quality - and extent of prefabrication - in this kit is superb, from finish-veneered ISOMACCURATE foam wing panels and precut fuselage sides with glued-on doublers, down to the smallest wood components. Plus an impressive selection of prefabricated hardware, profiled klunk tank, formed u/c, canopy, hardwood pack including camlock wing fasteners. You only need adhesives and dope to complete! Wings only cat no B-Q70/1 Canopy only cat no B-Q70/2.

QUEST KITS - where accuracy of prefabrication really counts. All shaped wood parts are cut on metal jigs for EXACT repeatability. 'ISOMACCURATE' foam wing cores are shaped on another special jig to give TRUE aerofoils (and finish-veneered in obechi). Fully illustrated step-by-step assembly instructions - no plan is needed as these kits really are prefabricated!

QUEST STOMPER 52" span aerobatic biplane for .40 - .60 engines. Total wing area 900 sq. in. All balsa and ply parts precision cut to shape with ready bonded fuselage side/doublers, printed with former positions for easy assembly. Top quality obechi veneered foam wings. Pre-finished obechi veneered front and rear turtle decks. Formed undercarriage and hardware pack.

Stomper cat no B-Q80 Upper Wings only B-Q80/1 Lower Wings only B-Q80/2.





. All shaped wood
ACCURATE' foam
rofoils(and finish-
' instructions - no

) engines. Total
shape with ready
or easy assembly.
hi veneered front
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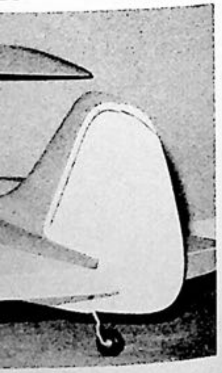
gs only B-Q80/2.

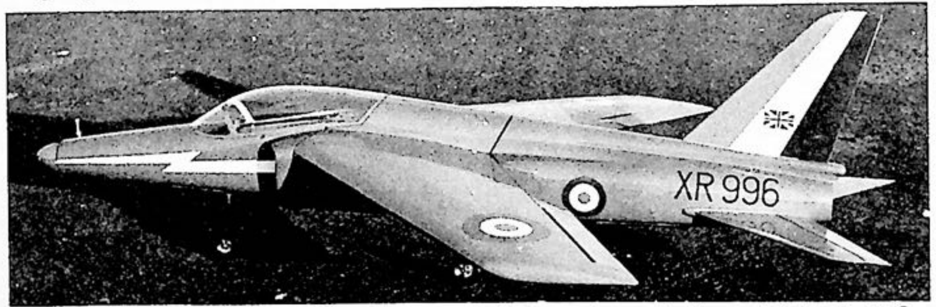


INTRODUCING

CAMBRIA KITS

with REVOLUTIONARY NEW 'TRITHANE' FUSELAGE MOULDINGS - in polyurethane foam with fibreglass reinforcement and hard glass-smooth surface skin! Immensely strong - yet lightweight. Superbly accurate - they are formed in metal moulds.

Other advanced features in these kits, too. Obechi-veneered foam wings - precut balsa parts - all to the highest standards of accuracy and finish. And four fully flight-proven designs - especially for radio control.



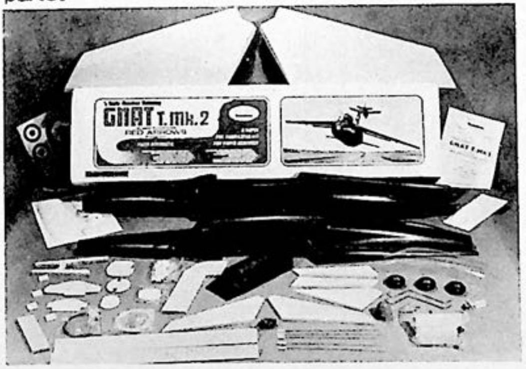
GNAT T. Mk2

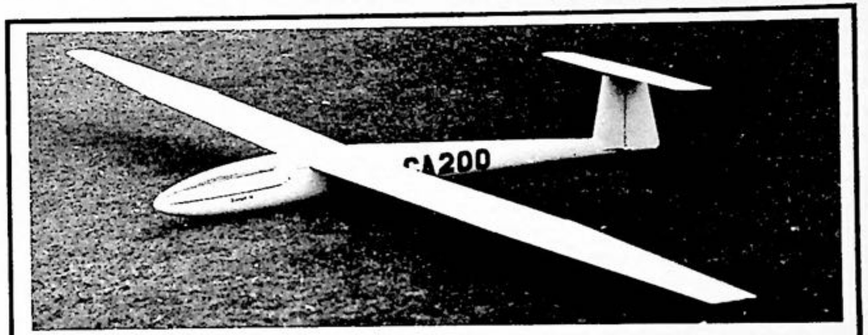
One-sixth scale aerobatic model for 4- or 6-function R/C powered by a .61 motor (in nose).

A SUPER PREFABRICATED KIT featuring a pressure-moulded grp reinforced 'Trithane' fuselage... obechi-covered foam wing panels (2½" thick at the root!)... tail part precut from selected balsa... preshaped ailerons... optional flaps... moulded ABS hatch covers and other parts.

Hardware items include spinner, wheels, 10 oz fuel tank, control horns, hinges, tube & cables for linkages, quick-links, preformed main & steerable nose undercarriage, authentic transfers & Red Arrow livery. Plus inst. manual. Span 48" '61' engines.

De Luxe Kit B-CB40D
Clubman Kit B-CB40C (complete kit less hardware, retract noseleg & accessories).
Maingear Retract U/C B-CB40/9
Nosegear Retract U/C F-RG1





DIAMANT '18'

One-sixth scale sailplane for 3/4 function radio. Very advanced aerodynamic design with modern laminar flow wing section and all-moving tailplane. Optional high aspect ratio flaps enable the model to be flown in wide range of wind speeds. Super prefabricated kit for easy assembly, featuring moulded fuselage, obechi-veneered foam wings, finished tinted 'Perspex' canopy - plus all components and accessories.

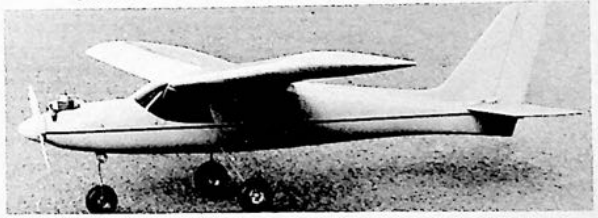
Span 119". Length 49¾".
Wing area 760 sq in.

Cat no B-CB10

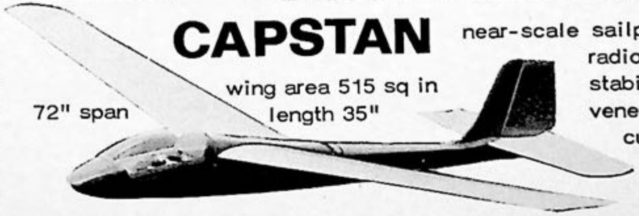
DRAGONFLY

sports model for 3/4 function radio and .15 - .35 engines. Rudder/elevator/motor - or ailerons can be added.

Prefabricated kit with one-piece moulded fuselage, obechi-veneered foam wings other shaped parts and hardware.
span 57" length 35½"
wing area 512 sq ins
cat no B-CB20



CAPSTAN

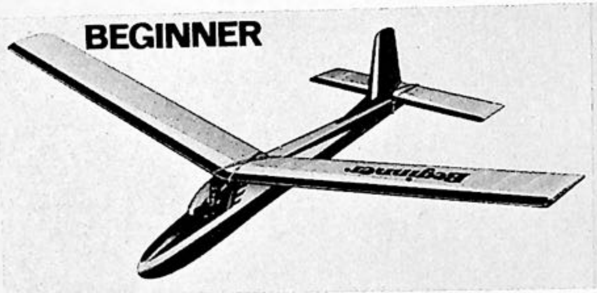


72" span
wing area 515 sq in
length 35"

near-scale sailplane for 2-function radio. Exceptional towline stability. Kit features veneered foam wings, precut balsa and ply parts etc. An ideal first sailplane. B-CB11

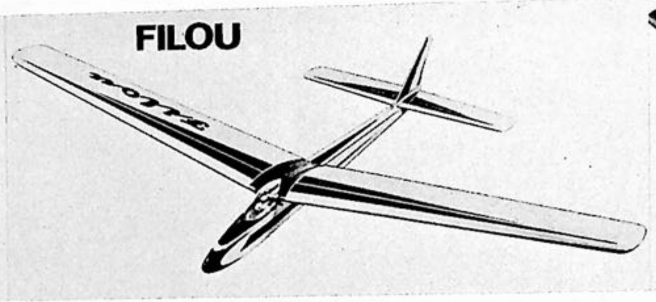
GRAUPNER GLIDERS

BEGINNER



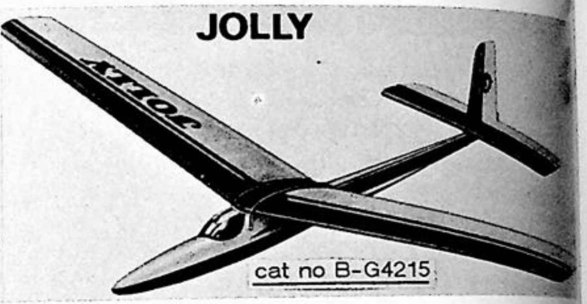
Kit includes Quickbuild plan, die-cut balsa sheets and aircraft quality ply, milled strip wood, tissue, cement, decals and miscellaneous parts.
span 39" length 26" cat no B-G4205

FILOU



Span 50". Area 360 sq.in. Kit contains Quickbuild plan, printed and die-cut balsa and ply parts, canopy, wire parts, tissue, decals, cement, etc.
cat no B-G4209 pylon mount B-G111

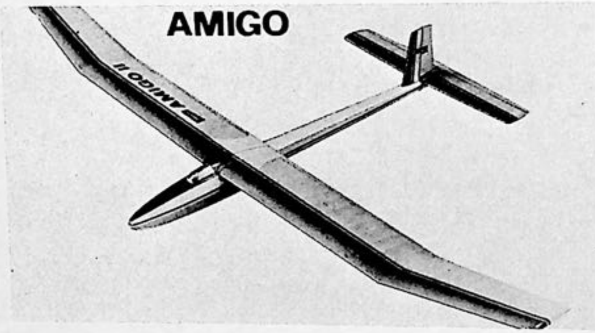
JOLLY



cat no B-G4215

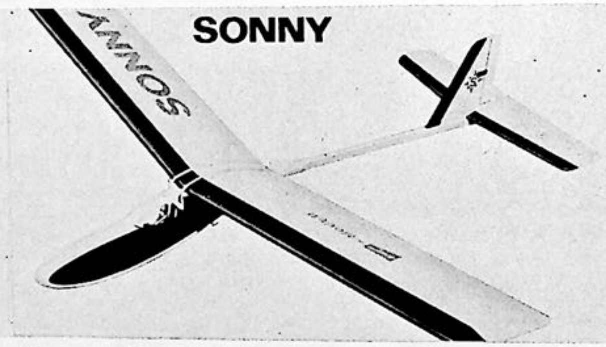
A/1 class sailplane fitted with dethermalizer. Converts to pylon power. Area 274 sq.in. Comple kit includes printed and die-cut wood, wire par dowels, tissue, decals. pylon mount B-G11

AMIGO



Kit is extremely prefabricated, die-cut balsa sheet and ply - plus milled and slotted strip, shaped wire tow-hook, etc. Span 78¾". Area 693 sq.in.
cat no B-G4219 pylon mount B-G164

SONNY



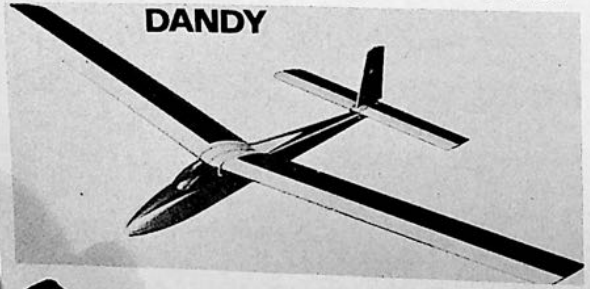
An exceptionally well performing beginner's model, of very simple construction. Span 27½" (700mm).. Kit includes die-cut balsa and ply, milled strip, tissue, cement, decals, etc. Cat no B-G4225.

UHU

cat no B-G4223

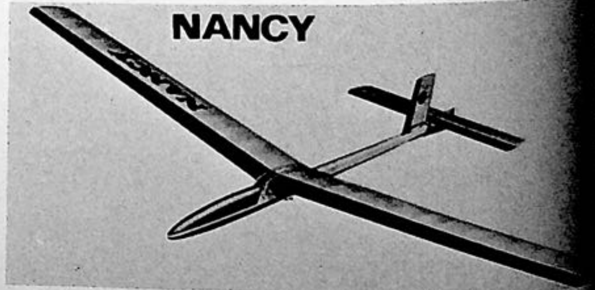
Basic A/1 class sailplane - the choice for annu Europa 'beginners' contest. Kit includes die-cu and printed balsa sheets, milled stripwood, ready formed plastic parts. Span 43¼". Area 243 sq.

DANDY



DANDY span 63" cat no B-G4227
F/F or R/C glider. Kit includes die-cut sheet, pre-shaped fuselage parts, milled and slotted stripwood, canopy, cement, tissue, decals, etc. Converts to pylon power. pylon mount B-G111

NANCY



NANCY span 48¾" cat no B-G4231
A/1 class sailplane featuring AUTO-RUDDER and dethermalizer. Kit includes milled and slotted fuselage nose, milled stripwood, die-cut and printed sheet balsa. For 'quickie' assembly.

Graupner

span 118"
length 45"
area 930 sq.in

This outstanding
formed fuselage
other parts in inje
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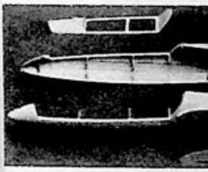
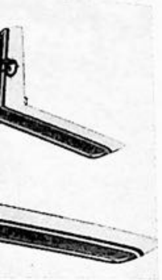
cat no B-G4229





hermalizer.
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mount B-G111

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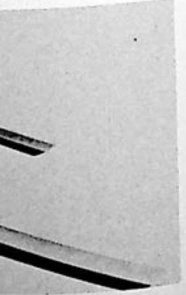
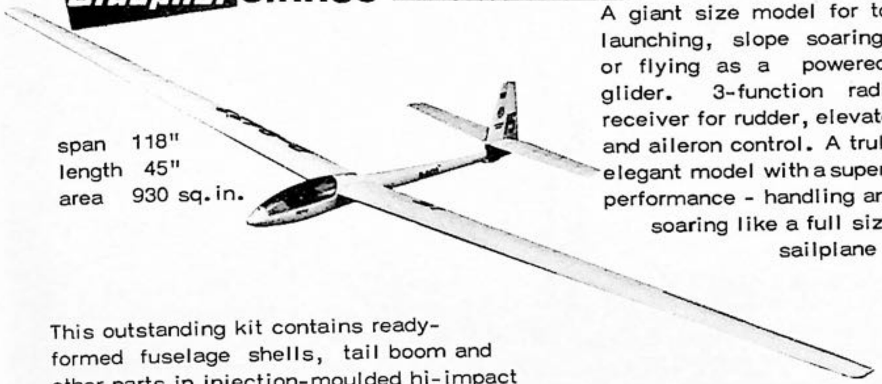
Area 243 sq.in.



RIPMAX

GRAUPNER GLIDERS and SAILPLANES

Graupner CIRRUS ONE SIXTH SEMI-SCALE MODEL

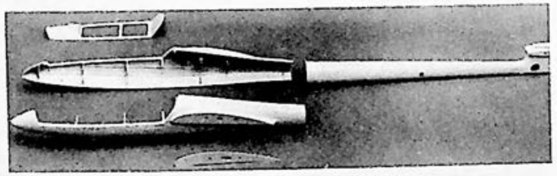


span 118"
length 45"
area 930 sq.in.

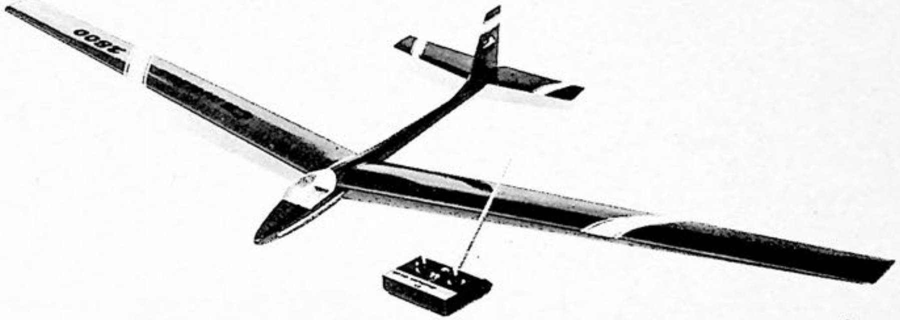
A giant size model for tow launching, slope soaring - or flying as a powered glider. 3-function radio receiver for rudder, elevator and aileron control. A truly elegant model with a superb performance - handling and soaring like a full size sailplane !

This outstanding kit contains ready-formed fuselage shells, tail boom and other parts in injection-moulded hi-impact ABS plastic. (see photo below). Plus die-cut and printed ribs, machined strip wood, formed wire parts, control horn for all moving tail-plane, canopy, cement, tissue, decals and other miscellaneous parts. Separate overlay plan gives details of R/C installation.
cat no B-G4229

SPARE PARTS
B-G4229/1 - canopy
B-G4229/2 - fuselage
B-G4229/3 - mounting ribs
B-G4229/4 - canopy frame
B-G129 - pylon mount
B-G166 - R/C inst. pack



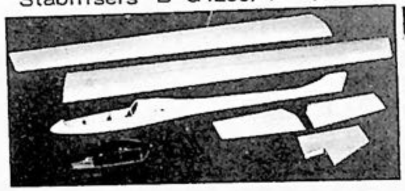
CUMULUS

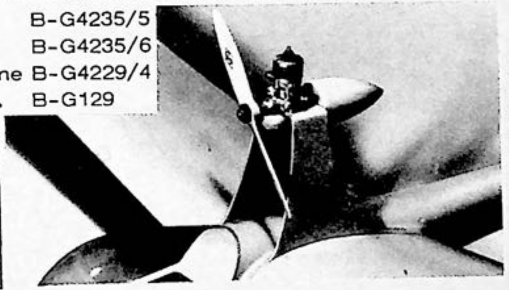


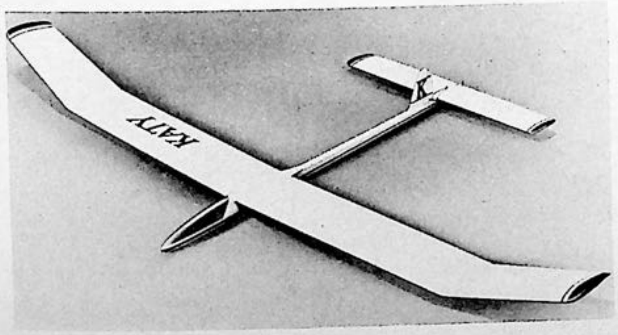
span 110"
length 49"
area 863 sq in

King-size R/C soarer for tow launching and slope soaring - or power-assisted thermal flying with pylon mounted engine. So prefabricated, it is almost a ready-to-fly model ! Fuselage fully assembled - finished balsa planked foam wings and tail panels - ready-to-fit canopy.
cat no B-G4235 R/C installation pack B-G159

Canopy	B-G4235/1	Rudder	B-G4235/5
Fuselage	B-G4235/2	Cabin	B-G4235/6
Wings (pr)	B-G4235/3	" Frame	B-G4229/4
Stabilisers	B-G4235/4	Pylon Mt.	B-G129







KATY

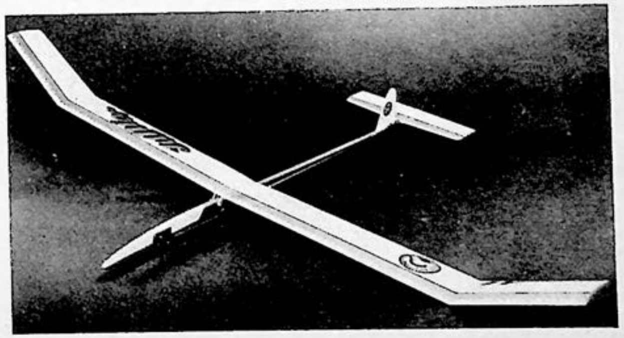
span 67" cat no B-G4233

Top performance A/2 class free flight sailplane - including auto-rudder and dethermalizer. Kit includes fuselage nose milled to shape, die-cut balsa sheets, wing fairing and other parts in plastic.

JUNIOR

span 53" cat no B-G4241

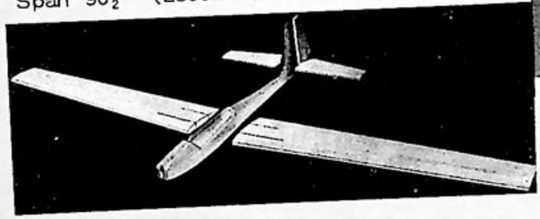
A new A/1 class model with highly-efficient easy-to-build profiled sheet balsa wing, with turbulator. Other shaped parts in balsa, etc - for quick and easy assembly. Fitted with auto-rudder and D/T.

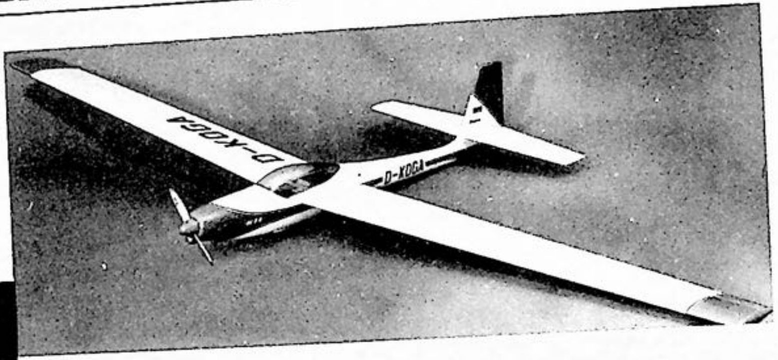


GRAUPNER SAILPLANES

AS K 14 cat no B-G4237

Designed right from the start as a powered sailplane. For power-soaring (free flight or R/C). - or R/C aerobatics! The fully prefabricated parts cut assembly time to a minimum. Fuselage moulded in GRP-epoxy. Foam wing and tail panels, balsa veneered - ready to fit. Span 90½" (2300mm). Engines up to .15



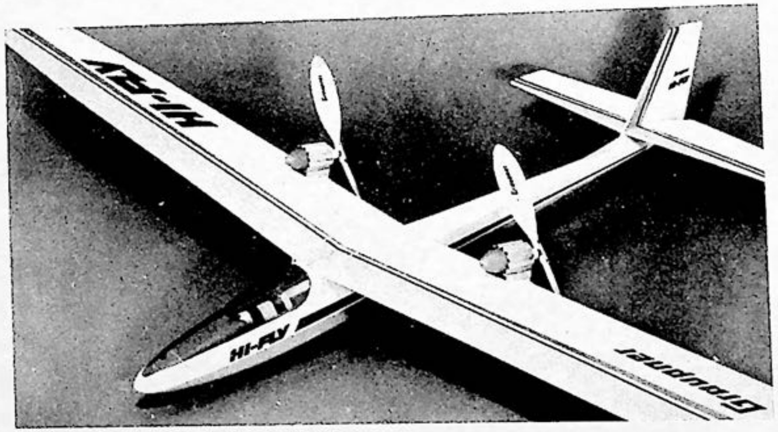


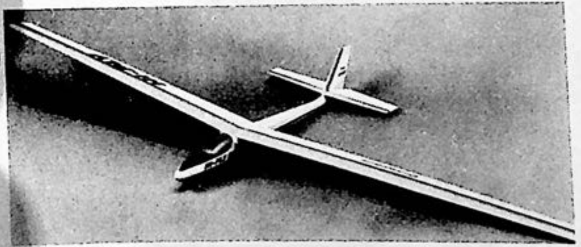
Canopy cat no - B-G4237/1
Fuselage cat no - B-G4237/2
R/C Installation Pack B-G165

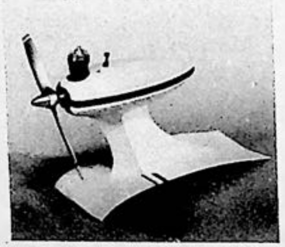
HI-FLY cat no B-G4239

It's the very latest in multi-purpose aircraft. Fly as a free flight or R/C glider, powered glider (with pylon mount), or ELECTRIC POWERED twin pusher! Rudder and elevator control in any of these configurations. Extensively prefabricated kit in the modern Graupner manner for quick and easy - and accurate! - assembly. Basic model has vee or polyhedral wing form. Thoroughly flight proven - in all three modes! Span 90½" (2300 mm).

B-G104	R/C Installation Pack
B-G164	Pylon Engine Mount

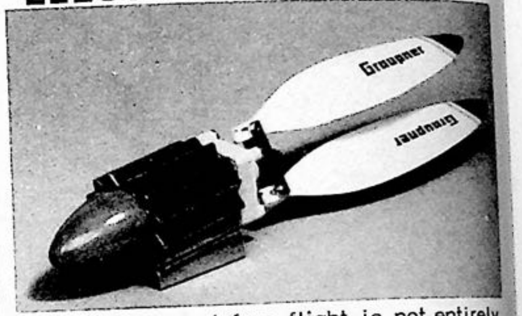






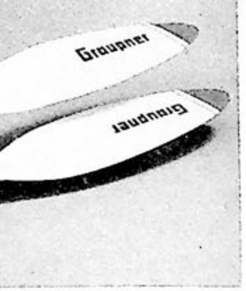
B-G237	Elec. Flight Mtr. Pack
B-G175	Elec. Flight Inst. Pack
B-G3421	E/F Battery 6v 1Ah
B-G3566	E/F Fuse 10A
B-G3583	E/F Fuse Holder
B-G3686	E/F Auto 12 Charger 12v
B-G3620	E/F Charger Leads
B-G3605	E/F Servo Switch
B-G190	E/F Folding Propeller

‘ELECTRIC POWERED R/C’



Electric-powered free flight is not entirely new, but it has never really been successful - until now! The Hi-Fly is the ultimate result. A highly efficient aerodynamic design - twin-pusher power - and folding propellers stretch the glide performance. But that is only part of the answer. The other two vital factors are a really powerful motor and batteries to stand up to the inevitable current drain. Graupner provide this answer in a complete electric flight motor pack, and rechargeable sintered nickel-cadmium batteries. All the 'power-on' duration you need - and you can recharge the batteries on the field. Heart of the power pack is a 12 volt JUMBO motor, capable of developing something like 1/10th HP. With the special prop matching the Hi-Fly, motor run is up to 8 minutes continuous, or 20 minutes flight time on a single charge. Batteries recharged in 30 minutes. Propeller and other accessories available separately.

WERED R/C



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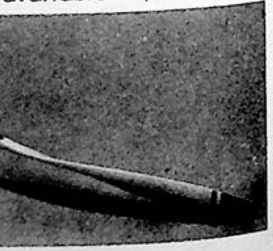
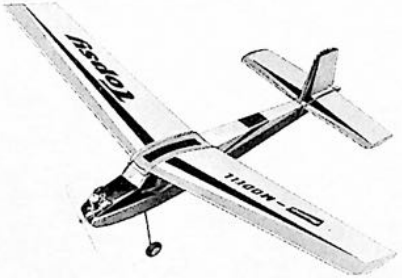
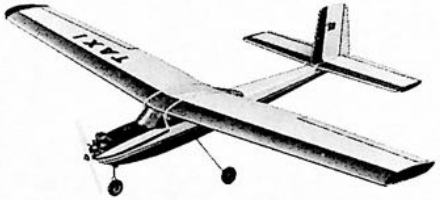
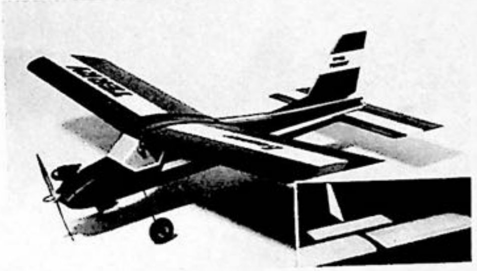
available separately.



GRAUPNER AIRCRAFT KITS







TOPSY cat no B-G4611
32" (820mm) span sport, free flight and R/C model for .020-.051 engines. 'Quickie' kit includes printed and die-cut balsa and ply sheets, stripwood, decals, wheels, landing gear, cement, tissue, and miscellaneous hardware.

TAXI cat no B-G4625
59" (1500mm) span R/C trainer with robust construction and excellent flight stability. Die-cut balsa and ply parts; pre-shaped engine mount, bulkhead and fairings; milled stripwood; shaped undercart, etc. etc. Two colour plan. An extremely prefabricated kit. Engines .15 to .35.

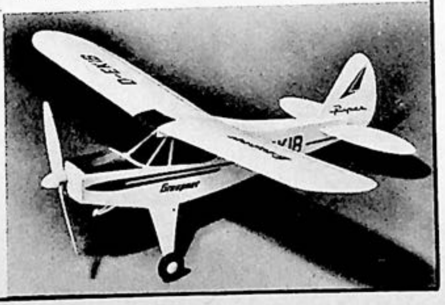
AMATEUR cat no B-G4623
43" (1100mm) span free flight or R/C model with an excellent performance. Takes .09 engines, or smaller. Profusely prefabricated kit includes printed and die-cut balsa and ply, milled stripwood, ready formed wire parts, etc. etc.

TERRY cat no B-G4635
Wings and tail surfaces in foam plastic, ready to assemble. Prefabricated sheet fuselage parts, etc, formed undercart, wheels, etc - very easy to assemble. 41" (1050mm) span F/F or R/C model for .09 engines.

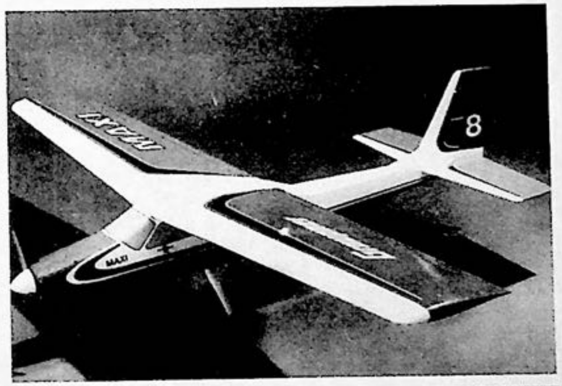
"RUBBER POWERED"

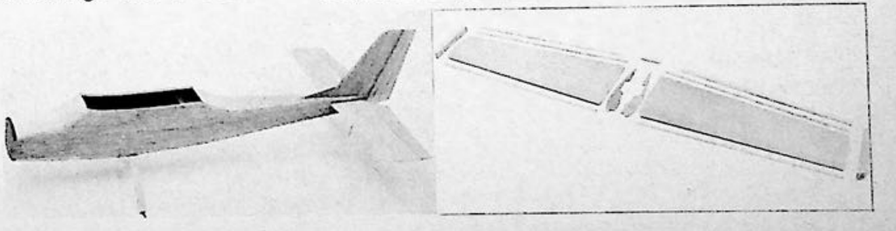
MONSUN BO-209 cat no B-G4421
A most realistic looking model, yet designed for excellent flight stability and performance. Powered by a rubber motor. The kit contains Quickbuild plan, colour-printed and die-cut balsa wings, die-cut wood parts, shaped wire parts, plastic propeller, wheels, etc. etc. Span 21½" (545mm)

PIPER SUPER CUB cat no B-G4423
21½" Span. Semi-scale rubber powered model. Kit contains fully shaped and contoured balsa wings (colour printed), die-cut balsa parts, plastic propeller, wheels, shaped wire parts, etc. Special Quickbuild plan and easy assembly guaranteed!

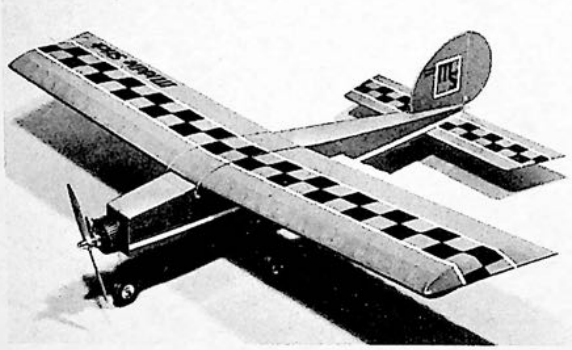


MAXI cat no B-G4639
Superb 63" span R/C model for rudder/elevator/aileron/motor control. Recommended motor size '35' or '40'. Die-cut parts include all fuselage panels, tail parts, etc. Finished veneered foam plastic wings, edging pieces; shaped undercarriage and all hardware items including wheels, decals, adhesives, etc.
R/C Fittings Set B-G272



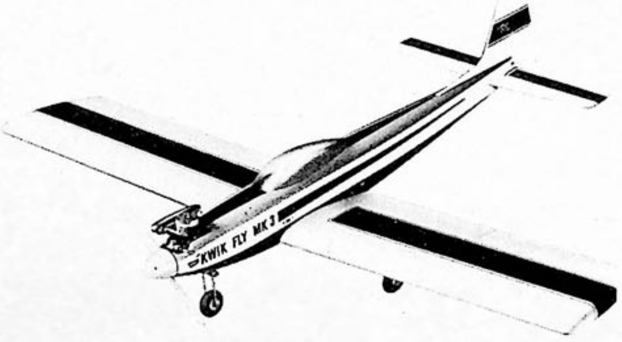


GRAUPNER
R/C AIRCRAFT



MIDDLESTICK cat no B-G4631

Top aerobatic performance from this well balanced uncritical design, with forgiving flight characteristics. Building time has been drastically cut by the provision of numerous pre-shaped parts - including pre-glued and pre-curved fuselage sides. Span 55" (1400mm) For engines up to .40.

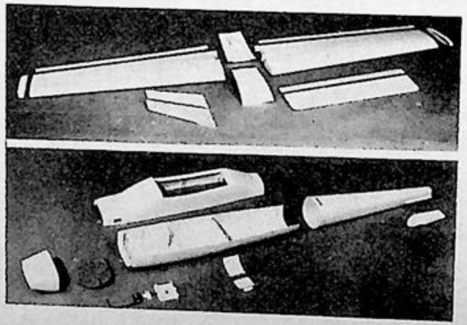


KWIK FLY mark 3 cat no B-G4629

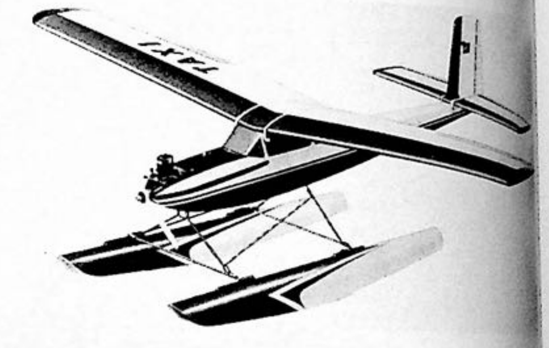
The 'ace' of aerobatic models, kitted for easy assembly. Shaped, pre-curved fuselage sides, fully shaped wood parts, die-cut balsa and ply, formed undercart, wheels, canopy, hardware, cement, decals, etc. Fully detailed plan, separate R/C installation plan. Span 59½" (1510 mm). For engines up to .61. Canopy B-G4629/1.

CARDINAL cat no B-G4633

Scale R/C model based on the popular American Sports plane - one seventh actual size. 61" (1550mm) span. Designed to take .35 - .40 engines (or the Graupner Wankel). A really de-luxe kit with lots of exclusive features.



Fully prefabricated parts include injection-moulded fuselage shells, tail boom, engine cowl, wing fairings, etc. Balsa-planked ready-formed foam wings and tail surfaces. Nickel plated main and steerable nose landing gear. Plus wheels, cement, decals, etc. Wheel Spats - B-G103 R/C Pack - B-G162 Spinner - B-G183

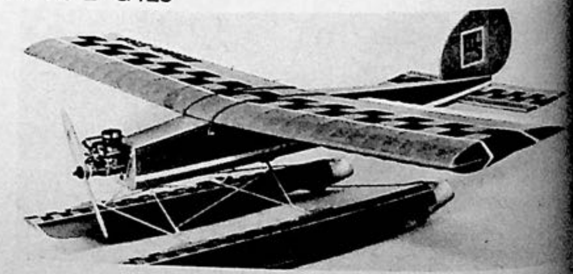


R/C SEAPLANES

Add a new dimension to R/C flying by fitting your favourite model with floats! Take off from and land on your nearest water site. With ample engine power it is surprising how little flight performance is affected - but it does call for extra piloting care on touch-downs!

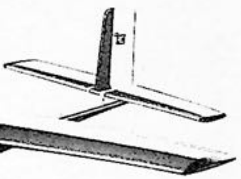
The GRAUPNER FLOAT KIT is based on a well-proven design - hydrodynamically and aerodynamically efficient. Stepped float bottom ensures good planing and excellent 'unstick' properties. Float length 27¼" (695mm). Float weight only 8½ ounces the pair (less wire struts). For any model the maximum take-off weight does not exceed 7½lb. An ideal mate to models like TAXI, MIDDLESTICK, KWIK FLY, etc.

Kit includes die cut balsa, balsa ply, stripwood, shaped wire parts, binding wire, cement.
cat no B-G123



MONSU

This de luxe model gives
standard, with easy ass
and plastic parts. The
sides, balsa covered foa
cowl, shaped tail parts,
wire undercarriage, wh
adhesives, decals, etc
too, specially designed
Recommended motor si
realistic cockpit layout
shaped parts.
R/C Fittings Set B-G2



LANES

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is based on a well-
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DDLESTICK, KWIK

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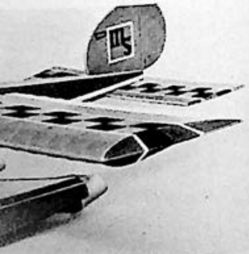
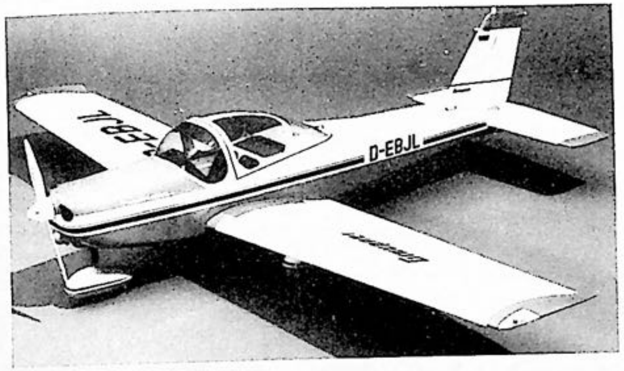


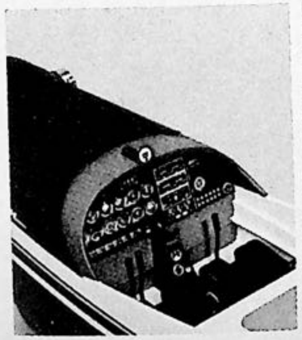


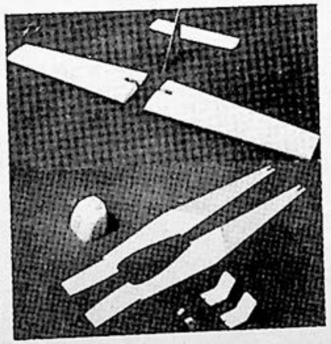
MONSUN

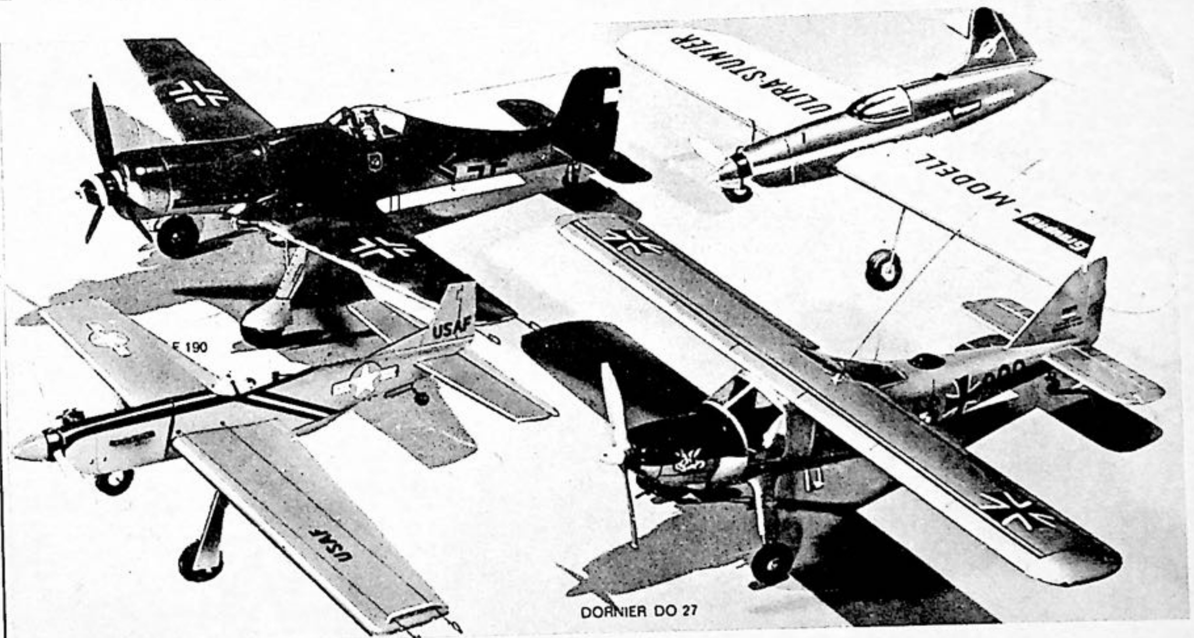
Cat no B-G4637

This de luxe model gives you scale realism to exhibition standard, with easy assembly from prefabricated balsa and plastic parts. These include full-length fuselage sides, balsa covered foam wing panels, moulded plastic cowl, shaped tail parts, tinted perspex canopy, shaped wire undercarriage, wheels, all necessary hardware, adhesives, decals, etc. Makes a superb flying model too, specially designed for 3 or 4 function R/C. Span 62". Recommended motor size '40'. Photos below show the realistic cockpit layout, also some of the many finish-shaped parts.

R/C Fittings Set B-G270 Wheel Spats B-G271







FOCKE WULF 190 cat no B-G4805

Detailed -- and authentic - scale model of this famous German World War II fighter. Span 39" (988 mm) Length 28½" (720mm) Wing area 182 sq in (11.8 sq dm) For 2.5cc engines. Kit contains Quickbuild plan, die-cut printed and preformed balsa and ply parts, stripwood, wire parts, RECORD WHEELS, rubber tyred tailwheel, engine cowl, decals, cement, plastic parts and many miscellaneous parts.

MUSTANG cat no B-G4801

Semi-scale model with profile fuselage and solid sheet wings and tail. Span 29¾" (755mm) Length 23" (580mm) For .15 glow motors or 2.5cc diesels. Quickie kit contains detailed plan, printed and die-cut balsa parts, wire parts, wheels, cement, control hardware, decals and miscellaneous parts. Easy to build and easy to fly.

ULTRA STUNTER cat no B-G1297

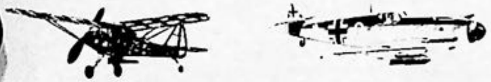
Highly aerobatic model designed for powering by .06 - .09 cu in engines (diesel or glow). Span 35½" (900mm) Length 20" (510mm) Wing area 235 sq in (15.2 sq dm). Kit contains die-cut and partially formed and printed balsa and ply parts, wire parts, wheels, cement, tissue, decals and miscellaneous parts.

DORNIER Do 27 cat no B-G4803

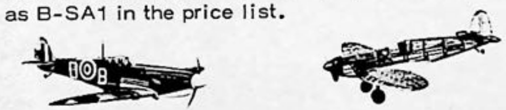
Extravagantly detailed scale model with an excellent flying performance. Span 31½" (800mm) length 25" (640mm). For 1.5cc engines (or .09 glow). Kit contains die-cut and partially formed and printed balsa and .ply parts, wire parts, wheels, cement, tissue, dope, decals and miscellaneous parts.

STERLING RUBBER POWER

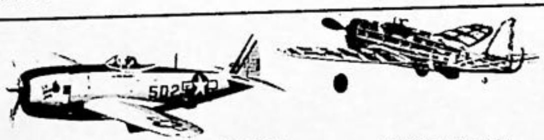
These incredible flying scale kits are precision made for easy assembly. Their excellent flying qualities and unique 'action-in-flight' features add fun and excitement. Kits made of selected balsa wood, sanded to micrometer tolerance. Parts die cut accurately for easy, trouble-free assembly. In-flight action mechanism included in kit installs easily, works every time, And, you get all this: handsomely-detailed formed plastic parts, moulded plastic prop, rubber wheels, precisely-finished wire parts ready for installation, rubber-band motor, authentic scale decals plus full-size plans with easy-as-ABC instructions.



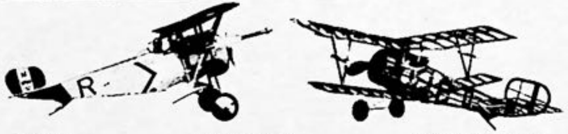
Note: Sterling Kit code numbers shown on these two pages as A-1, A-2, etc. are prefixed by B-S in the separate price list. For example, Kit A-1 is shown as B-SA1 in the price list.



KIT A-3 **BEECHCRAFT BONANZA** **WING SPAN 22"**
World famous executive plane, known for its distinctive "V" tail and its built-in stability. Popular with all pilots for easy flying and efficient operation. Duplicating the action of retractable landing gear, our model **DROPS LANDING GEAR** prior to landing.



KIT A-4 **THUNDERBOLT P-47** **WING SPAN 22"**
One of the most heavily armed fighters of the United States Air Force accompanied Fortresses and Liberators in destructive attacks on Axis facilities. Our model in perfect scale, has operating **LANDING GEAR** that **DROPS** just prior to landing.

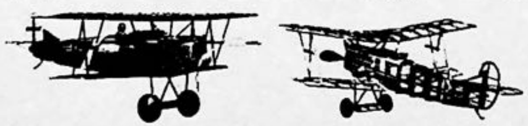


KIT A-5 **NIEUPORT 17** **WING SPAN 24"**
One of the truly great French Fighters of World War 1. Established an enviable record for downing German Observation Ballons by **FIRING ROCKETS**, which our model does automatically in Flight — Dramatically — with uncanny realism.

KIT A8 **MESSERSCHMITT ME-109-G** **WING SPAN 17"**
Authentic rubber-powered flying scale model of the most famous German fighter and fighter-bomber of World War II. Automatically **DROPS BOMB** in flight with simple mechanism in kit.

KIT A9 **AT-6 TEXAN** **WING SPAN 18"**
U. S. Army and Navy pilots alike learned to fly on this famous World War II advance trainer! This model in perfect scale **OPERATES LANDING GEAR** that automatically lowers just prior to landing.

KIT A10 **CURTISS HAWK P-GE** **WING SPAN 16"**
Legendary U. S. Army Air Force fighter of the fabulous 1930's, these glamorous planes were actually squadron-painted to resemble a hawk. This faithful replica **DROPS BOMBS** in duet automatically with simple mechanism.



KIT A-1 **FOKKER D7** **WING SPAN 24"**
Most popular fighter of German Air Force in World War I. Our model automatically **FIRES ROCKETS** in flight with simple mechanism included in kit, as it simulates the fine flying qualities of its prototype.

KIT A-6 **STUKA DIVE BOMBER** **WING SPAN 20"**
World War II's most infamous plane. Used in early part of war, it reduced cities to rubble in advance of the German Ground Forces. Our model is a faithful replica that **DROPS BOMB** in flight with mechanism included in the kit.

KIT A11 **CESSNA 180** **WING SPAN 17"**
This beautiful and versatile 4-passenger personal aircraft is adapted for use as a cloud seeder to produce rain! This model in perfect scale **SEEDS CLOUDS** dramatically, with amazing likeness.

KIT A-2 **STEARMAN PT-17 CROP DUSTER** **WING SPAN 20"**
Thousands of U. S. and Allied pilots earned their wings in this Famous Training plane of World War II. After the war they were outfitted with a 450 H. P. P. & W. engine and front seat removed for **CROP DUSTING** which our model does with amazing likeness.

KIT A7 **PIPER SUPER CUB** **WING SPAN 18"**
This world-famous trainer and personal aircraft was specifically developed for agricultural **CROP DUSTING** and similar work. Authentic model does the job with uncanny realism.

KIT A12 **L-19 BIRD DOG** **WING SPAN 17"**
This remarkable airplane was the U. S. Army's "jeep with wings" in Korea. Used originally for artillery spotting. Model **DROPS PROPAGANDA LEAFLETS** in flight.

RIPMAX

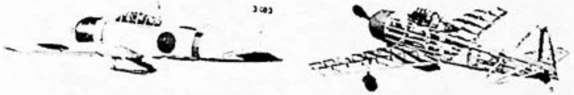
STERLING RUBBER POWER

KIT A-13 **P-51D MUSTANG** **WING SPAN 24"**

Tough, fast and highly maneuverable, the Mustang was one of the greatest allied fighter-bombers of World War II, DROPS TWO BOMBS—simultaneously, in flight.

KIT A-14 **F4U-5 CORSAIR** **WING SPAN 24"**

Navy and Marine pilots flew this famous inverted gull wing fighter-bomber with devastating success in World War II. Our faithful replica offers uncanny MULTIPLE action. **SIX ROCKETS**, three under each wing, **FIRED IN FLIGHT**—two at a time—AUTOMATICALLY.



KIT A-15 **ZERO** **WING SPAN 24"**

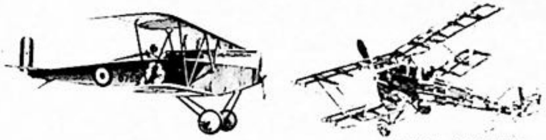
Britain had her Spitfire· Japan had the deadly Zero. A formidable fighter, the Mitsubishi A6M3 "HAMP" was feared before and after Pearl Harbor. **RELEASES BELLY TANK**—with dramatic realism—in flight.

KIT A-16 **FOKKER D-8** **WING SPAN 21"**

Achtung! The dread "Flying Razor" of World War I comes alive again. In its day, the Fokker D-8 was the most advanced and efficient fighting aircraft. Automatically **UNLEASHES** twin **BOMBS** while in flight.

KIT A-17 **S. E. 5a** **WING SPAN 22"**

During World War I, this fighting scout of the Royal Air Force wreaked havoc on the top fighters of the Imperial German Air Force. This great biplane was also used to knock out enemy airfields and rail centers. Our authentic scale model **DROPS** its twin **BOMBS** automatically, in flight.

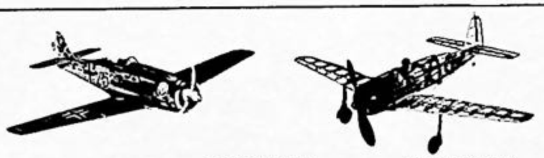


KIT A-18 **ANSALDO S.V.A.5** **WING SPAN 19"**

The mainstay of the Italian Air Force until the end of the first World War was this long range scout-fighter. The Ansaldo S.V.A 5 was also used for propaganda purposes. Our model **DROPS LEAFLETS** just like its real-life counterpart did, automatically in flight.

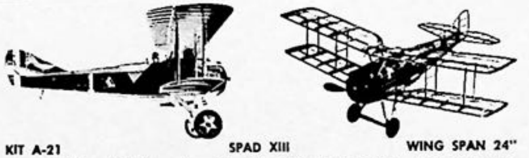
KIT A-19 **SPITFIRE Mk 1** **WING SPAN 24"**

One of the truly great fighters of World War II, The Spitfire was the backbone of the R.A.F. Fighter Command . . . and the mainstay of the Battle of Britain. Our authenic scale model drops two bombs simultaneously . . . in flight!



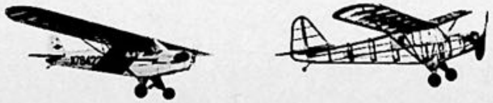
KIT A-20 **FOCKE-WULF 190** **WING SPAN 24"**

The Luftwaffe's most formidable fighter for much of World War II. Remarkably manoeuverable, with instant response, The 190 marked a milestone in fighter design. Our faithful flying replica automatically drops bomb in flight!



KIT A-21 **SPAD XIII** **WING SPAN 24"**

The fabled French Fighter of countless World War I dog fights. A favorite of the A.E.F. the glorious exploits of the legendary Spad are inscribed forever in the annals of fighter aircraft history. Our model in perfect scale drops two bombs . . . automatically . . . in flight!



KIT A-22 **PIPER CUB J-3** **WING SPAN 30"**

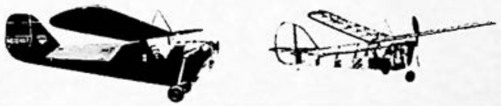
The most famous and widely-seen light plane in the U.S.A., the Piper Cub holds a unique place in aviation history. Held in high esteem by the untold thousands who learned to fly in the Cub, it also served as Crop Duster, Ambulance and even did some artillery spotting in World War II. Our model is authentic and a beautiful flyer.

KIT A-23 **FOKKER EINDECKER E-III** **WING SPAN 25"**

Forerunner of the famous line of World War I Fokker fighters, the Eindecker was the first to use machine guns synchronized to fire through the propeller. Flown by Oswald Boelcke and Max Immelman and many other German aces. Simple lines and large wing makes this authentic beauty an excellent flyer.

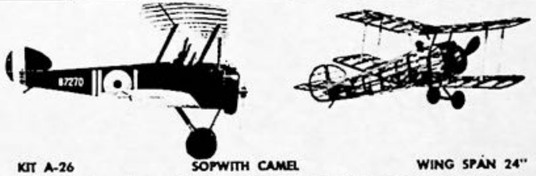
KIT A-24 **HAL KRIER'S GREAT LAKES SPECIAL** **WING SPAN 24"**

This fabulous biplane of the Golden Thirties was rebuilt by the Krier Brothers for barn-storming and aerobatics. With a 185 hp engine and a flashy paint job, Hal Krier proceeded to win everything in sight including the Champion of Champions Trophy. Our model is as beautiful in the air as on the shelf.



KIT A-25 **AERONCA C-3** **WING SPAN 36"**

This marvelous airplane trained many thousands of pilots in the early 30's. It is especially dear to the hearts of all scale model builders because it is so well suited to great model flying with its large wing and tail, and low center gravity.



KIT A-26 **SOPWITH CAMEL** **WING SPAN 24"**

This is the "super-famous" fighter which constantly flies over the front lines looking for the "Red Baron." Our kit is an authentic reproduction of this classic World War I bi-plane; and an excellent flyer.

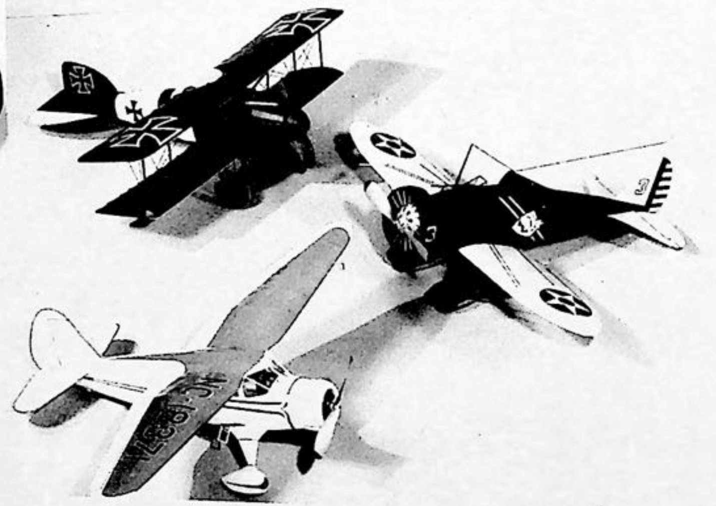
KIT A-27 **SCHWEIZER 2-32** **WING SPAN 42¾"**

A truly magnificent 42¾" reproduction of the Schweizer 2-32 sailplane. With the tremendous popularity of sailplane flying today, the Schweizer is a must for every modeler. Faithfully reproduced, the flight performance of this giant 42¾" beauty is truly amazing. It performs like a real competition tow-line glider.

STERLING "6" WAY KITS

Unique - because of the amazing scale detail in kits which are easy to build. Unique - since they can be built six ways - rubber powered, or engine powered. For F/F, C/L, R/C or static scale.

FABULOUSLY-AUTHENTIC SUPER-DETAILED "STICK MODEL" KITS - Any version makes a museum-like model. Frame members are accurately die cut from the finest quality balsa wood, and every part is numbered to ensure fast and accurate assembly as clearly shown on the easy step-by-step plan. Highly detailed plastic parts simplify assembly. Covering material, formed wire parts, wheels, decals, hardware, etc. all included in these fine kits.

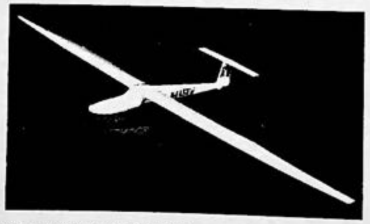


FLY with -

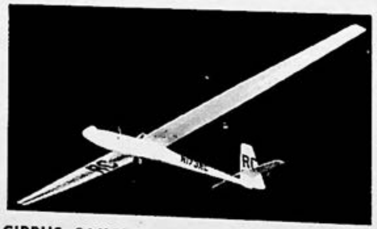
RUBBER POWER
020 GLOW
049 GLOW
CO_2 ENGINE
FREE FLIGHT
CONTROL LINE
OR
RADIO CONTROL

or build as a detailed static scale model.

CITABRIA (top left)
33½" span cat no B-SE5
STINSON RELIANT SR8
31½" span cat no B-SE8
ALBATROS D111-A
27¾" span cat no B-SE9
BOEING P26-A
28" span cat no B-SE10
DIAMANT SAILPLANE
74" span cat no B-SE3
CIRRUS
87¼" span cat no B-SE7

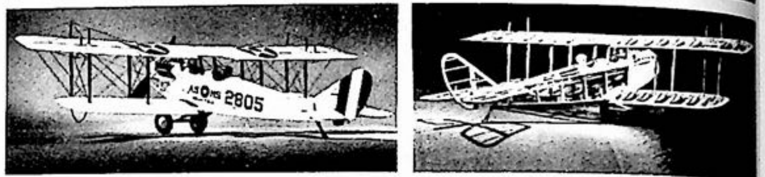


DIAMANT SAILPLANE Wingspan 74"

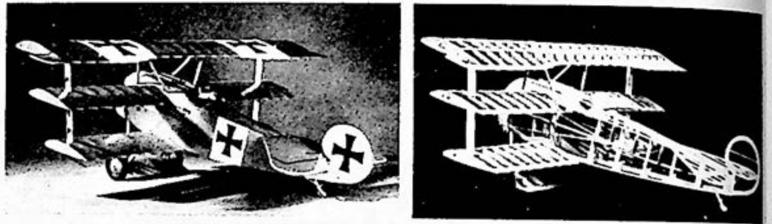


CIRRUS SAILPLANE Wingspan 87 5/16"

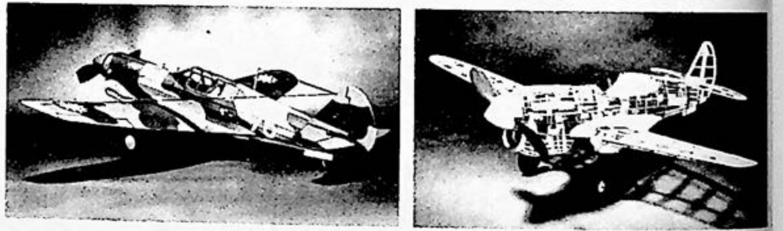
RIPMAX



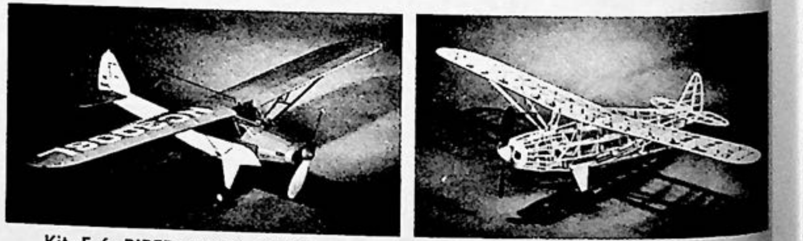
Kit E-1 CURTISS "JENNY" JN4-D2 Wingspan 32¾"
A perennial favorite of all time with modelers and public alike, the Jenny is a real nostalgic beauty. Detailed plans



Kit E-2 FOKKER DR-1 TRIPLANE Wingspan 23½"
Scourge of World War I especially with the RED BARON at the controls. Our tripe model is amazingly realistic



Kit E-4 CURTISS P-40 WARHAWK Wingspan 27"
The Flying Tigers made history in the mountains of Burma and China. Our Warhawk is a faithful reproduction



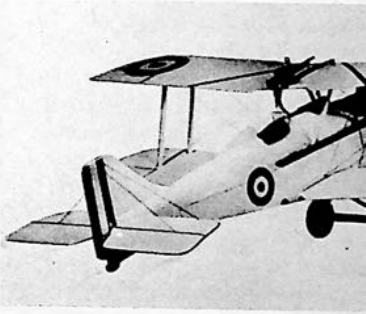
Kit E-6 PIPER SUPER CRUISER Wingspan 35½"
A real classic is this 3 place sport plane. A favorite with model builders everywhere since Piper introduced it in the forties.

Note: Kits E-1 etc. are listed as B-SE1, etc. in price list.

RIPMAX

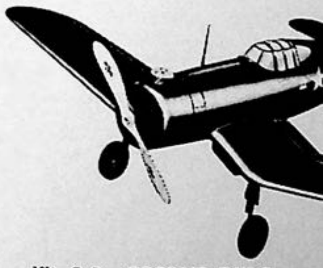
This is a selected range
wing spans ranging fron
.19 glow upwards or 2.5
looks and scale authent
performance. Prefabric

Note:



SE5A World War I Biplane c
This model is 32" span ar
powering by .19 to .35 glow
diesels. Realism extends t
Lewis gun on top wing, sca

Famous Gull Wing W.W.



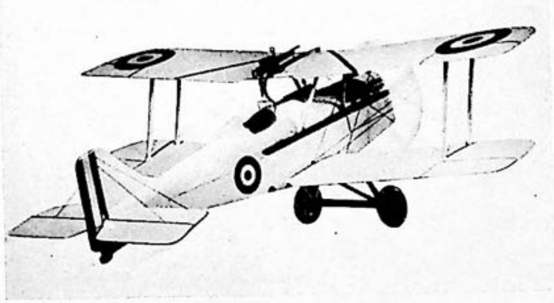
Kit C-9 CORSAIR F4U-1
Wingspan 36" Engine

RIPMAX

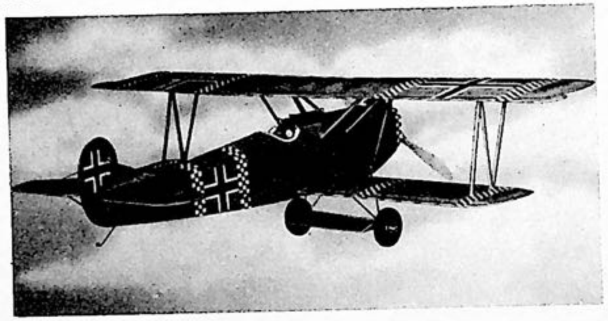
STERLING CONTROL LINE

This is a selected range of superb control line scale models with wing spans ranging from 32" to 36" (matching engine sizes from .19 glow upwards or 2.5 to 3.5cc diesels). Designed not only for looks and scale authenticity, but stable, easily controlled flying performance. Prefabricated of the finest material they contain top quality balsa wood which has been density selected and sanded to micrometer tolerance, cleanly die cut for accurate trouble free assembly. Many shaped parts - plywood, hardwood, formed landing gear, authentic decals, hardware, cowlings and much more ... All designed for your building and flying pleasure.

Note: Kits C9. C10 and C12 are listed as B-SC9, B-SC10 and B-SC12 in the separate price list.



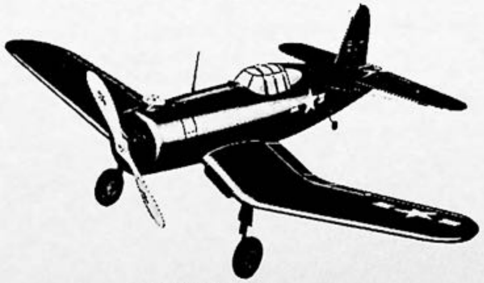
SE5A World War I Biplane cat no B-SC6
This model is 32" span and suitable for powering by .19 to .35 glow motors or 2.5cc diesels. Realism extends to such details as Lewis gun on top wing, scale rigging, etc.



FOKKER D-7 World War I Biplane cat no B-SC8
An ideal companion model to the SE5 - and just as authentic in appearance and detail. Wing span 32½". For powering by .19 to .35 glow motors or 2.5cc diesels. An easy model to build - and fly.

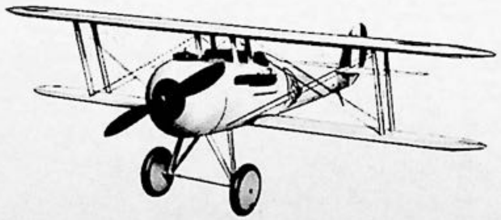
GREAT LAKES TRAINER cat no B-SC13
The Great Lakes trainer is noted for its excellent flying capabilities - features duplicated in this authentic scale model. Wing span 36" for powering by .19 to .35 glow motors or 2.5cc diesels.

Famous Gull Wing W.W. 2 Fighter



Kit C-9 CORSAIR F4U-1
Wingspan 36" Engines .19 to .60

Capt. Eddie Rickenbackers W.W. 1 Fighter



Kit C-10 NIEUPORT 28
Wingspan 33" Engines .19 to .35

Most used military training Airplane of W.W. 2

Kit C-12 STEARMAN PT-17
Wingspan 32½" Engines .19 to .35

CONTROL LINE FLYING

Looked easy didn't it? That fellow with the large aerobatic control-liner painting patterns all over the sky was in full command wasn't he? But now that you are clutching the control handle and the motor is running ready for that first solo, it seems just a little different....

Right, first job is to stop the motor! Now carefully check that the centre of gravity is in the correct place, as shown on the plan - or even a little in front. This is most important, as if the centre of gravity (C.G.) is too far rearward then the model may well be virtually uncontrollable, and if too far forward it will be over-stable and very 'sluggish' on the controls. The C.G. should be at around 25-30% of the wing chord, measured back from the leading edge. Securely screw on lead ballast at the nose or tail if necessary.

This job done, return to the handle and make sure that when the handle is held normally (vertical) the elevator is at neutral - have your friend hold the model off the ground at the same height as the handle while you check this - and adjust the line length if required. Check also that the controls move freely - if they do not, then squirt some fuel onto the hinges and work the controls until they free-up.

Now station your helper with the model downwind of the flight circle, ready for take-off. That's right, downwind - this is so that by the time the model has gathered speed it will be flying into wind to assist a smooth take-off. If your plane has an undercarriage, the grass is short and you have at least a 2.5cc engine, then it will take off from the ground - if not, then it will require a hand launch.

Back to the engine: start it up and adjust it so that it is 'screaming' and running as fast as it can, then open up the needle valve a quarter of a turn. Check that with the nose of the aircraft lifted up at 45° it will still run smoothly; if not try opening the needle a little more. All set? Then walk to the handle running your hands along the lines as you go to make sure that they are not snagged by the grass. If you are going to take off from the ground, then your helper should have been instructed to point the nose of the model away from yourself, out of the circle, in order to keep the lines taut - and to give just a gentle push to start the wheels rolling. Should a hand launch be necessary, then your helper should hold the model by the fuselage and outboard wing tip in an underarm fashion, run a few paces and release the model smoothly with the nose pointing away from you, again to keep the lines taut. He should not throw it, just use a 'follow' through action to allow the model to fly away smoothly by itself.

Just before the all-important launch, operate the controls and make sure that the handle is the right way up! Hold your arm out in front of you.... and relax! Wave your left hand to signal your helper to release the model, and as it leaves his hands, step backwards, pulling on the lines to maintain line tension and give you full control - the handle should be held at neutral or with just a little up elevator. And that's it! You're airborne!

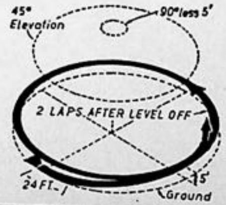
Of course, now comes the tricky bit.... the most common error made by beginners is overcontrolling, so make all movements of the handle slight, letting the model fly itself. Do not jerk your wrist while flying, but move your whole arm - thus if you wish to climb, raise your arm and lower it to dive. Aim to keep the model 10 - 15 feet above the ground, straight and level. At this point you may well find that it is circulating in a series of swoops, plunging towards the ground then climbing rapidly - and this is your fault! Relax more, and stop over controlling - hold your handle steady and the plane will respond. You will also find that if there is a breeze blowing, then the model climbs as it goes into wind, dives as it travels downwind, so be prepared for a little correction and remember that the model will respond quicker to 'down' elevator than it will to 'up' - so go careful with the controls, as the ground is quite hard and models quite frail...

If you are lucky, then the next real problem will be the landing, although most novices do not have to worry about this too much as a 'forced landing' often terminates the first few flights! However, if all is well, you will know that the flight is about to end when the engine suddenly speeds up, falters, then speeds up again - it is running out of fuel. At this point, make sure that it does not climb high, especially when travelling into wind. As the mot

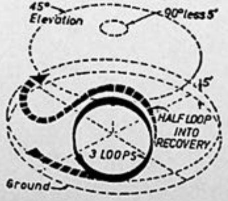
STANDARD STUNT PATTERNS

(see also page 38)

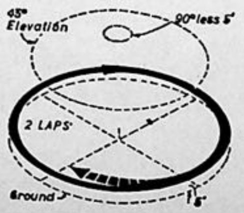
Take-off.



Consecutive Inside Loops

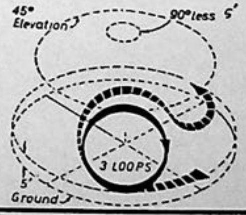


Inverted Flight

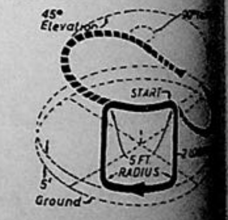


Consecutive Outside Loops

(Three Required).



Consecutive Outside Squar



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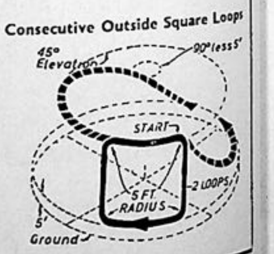
e that it does not climb high,
elling into wind. As the motor


Consecutive Outside Square Loops

---

dies, lead the model with your arm to keep the speed up, and walk backwards to maintain line tension - holding neutral or even slight up elevator, and let the model sink to the ground. When it is a couple of feet above the grass give just a little up elevator to "flare it out" and it will gently float to the ground - your first solo is over.

However, if you were less fortunate, then you may well have "pranged". If so, check the model over for damage, and if any cracks have appeared, stop flying and repair the damage. Should fuel get into the balsa wood it will be impossible to glue the wood together again properly. Not damaged? Good, but check the engine is not covered in dirt.

So, now you have mastered the basic rudiments of flight, what next? Firstly, practice climbs and dives, discovering the effects of sharp application of elevator control until you know the characteristics of your model and until you feel safe. Provided that your model is capable of aerobatics, now is the time for advancement. However, if you have a plastic ready-to-fly aircraft, or a trainer with all-sheet wings, then you need a new model; these types are not capable of aerobatics.

The wing over is the easiest manoeuvre, consisting of a sharp climb when the model flys overhead and dives towards the ground before levelling out. To attempt this, start in easy stages. As the model goes into wind, apply full up elevator until the model climbs steeply, then relax control back to neutral. The plane will continue to climb, pass overhead, then dive towards the ground. About 15-20 feet above the ground, apply up elevator and it will level off - manoeuvre until confident, so that the model will climb and dive vertically, then recover smoothly.

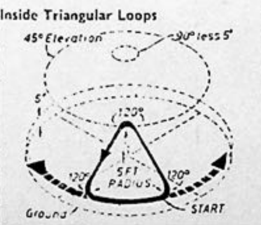
Right, now for a loop. Fly a couple of laps at around 20 - 25 feet altitude, then as the plane travels downwind dive towards the ground slightly to gather speed. When 15 feet above the ground give full up elevator - the model will climb rapidly then curl over onto its back and tumble over in an untidy loop - give slight down elevator when it is on an even keel to level out. Ugly wasn't it, but at least it was a loop! No doubt it juddered horribly as it looped, and nearly 'stopped' flying - all due to too much elevator control. The solution is to apply less up elevator, and to 'fly' the model around the loop - ease off the elevator control as the model goes onto its back, then as it travels towards the ground (upside down) gradually increase the 'up' control again until it completes the loop and levels out. A loop therefore is not just the result of one control movement, a smooth one consists of several control movements. Again practise hard - and even try to do a couple of consecutive loops, making sure that airspeed does not fall off too much - if this looks like happening, open out the manoeuvre by backing off the up elevator control. Do not worry about twists in the lines - this will not affect control, but do undo the twists after each flight to prevent the lines from binding up.

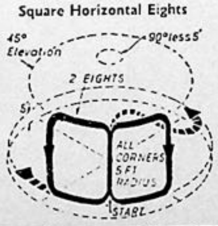
With this much experience under your belt, you are now ready for the next major obstacle - inverted flying. Remember when flying upside down that the controls are reversed 'up' is 'down', 'down' is 'up' - repeat this all the time.

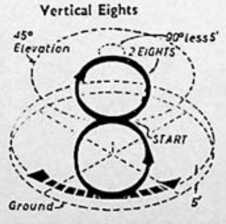
Proficiency at inverted flying is the key to full control of this type of model; once it is instinctive then you really start to fly!

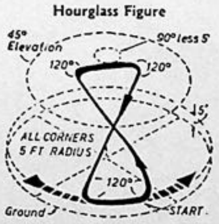
The most favoured approach for inverted flying is to practise elongated loops - as the model goes inverted at the top of the loop, apply a little down elevator so that it flies parallel to the ground for a few yards before giving 'up' again and completing the loop. Practise this hard, stretching the 'flat', inverted section at the top of the loop until you are doing at least half a lap inverted, repeating to yourself 'down is up, up is down!' Do remember to keep this (and indeed all manoeuvres) downwind in order to maintain line tension - when first trying these stretched loops go past the downwind point before starting the half-loop so that the manoeuvre is still completed with the model flying downwind. Eventually you will find that your confidence grows allowing you to stretch the 'loop' to a full lap of inverted flying - then you have succeeded! Now try cautious laps of inverted flying experimenting with climbs and dives, just as you did when you first went solo, but now the controls are reversed.

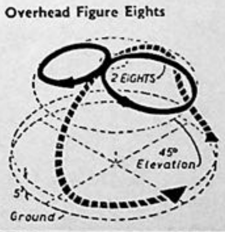
The diagrams below show most of the range of manoeuvres flown in aerobatic competitions.

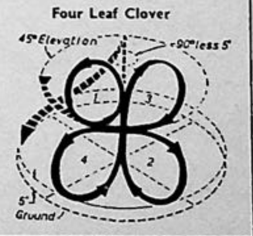

Inside Triangular Loops


Square Horizontal Eights


Vertical Eights


Hourglass Figure


Overhead Figure Eights

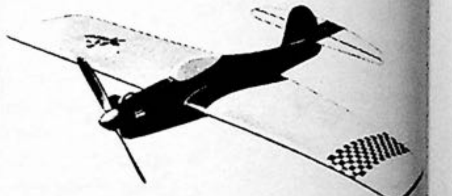

Four Leaf Clover

STERLING CONTROL LINE

SEMI-SCALE and ORIGINAL designs

Here they are ... a wonderful new range of control line models awaiting your selection. Every one tops in its field for stunt, combat or just plain "Sunday Flying". All are easy to build, completely prefabricated with accurately die cut and/or shaped parts. Sterling's finest materials and workmanship goes into these models ... and you will have the time of your life flying any one of them in only a few hours.

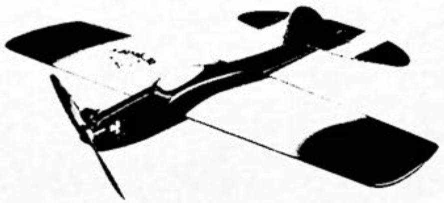
Note: Sterling Kits S-1, S-2, etc. on these two pages are preceded by B-S in the listing in the separate price list. For example, Kit S-1 is shown as B-SS1.



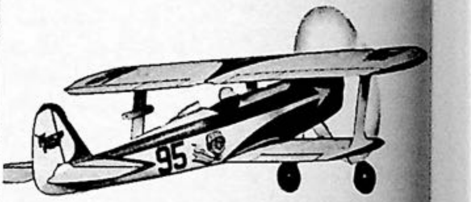
Kit S-1 RINGMASTER
Wingspan 42" Engines .19 to .35

Kit S-2 F-51 MUSTANG
Wingspan 38" Engines .19 to .35

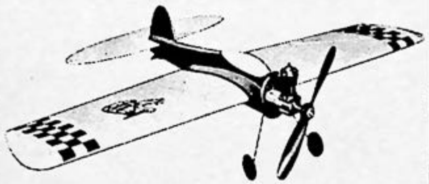
Kit S-3 YAK-9
Wingspan 40" Engines .19 to .35



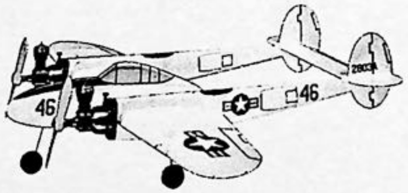
Kit S-5 RINGMASTER JR.
Wingspan 30" Engines .09 to .19



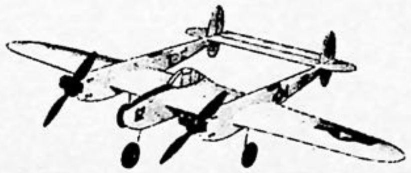
Kit S-12 FLYING FOOL
Wingspan 34" Engines .19 to .35



Kit S-13 BABY RINGMASTER
Wingspan 21" Engines .020 to .049

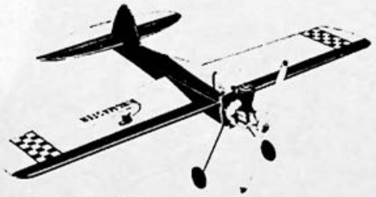


Kit S-14 LOCKHEED P-38 LIGHTNING
Wingspan 24" For .049 Engines

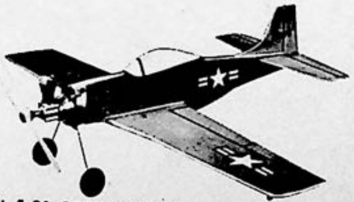


Kit S-17 LOCKHEED P-38 LIGHTNING
Wingspan 36" Engines .09 to .19

Kit S-19 SPITFIRE
Wingspan 52½" Engines .29 to .35



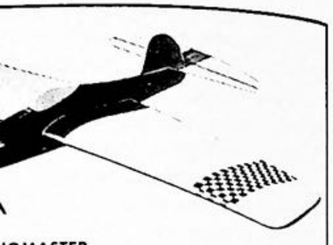
Kit S-30 BEGINNER'S RINGMASTER
Wingspan 21" For .049 Engines



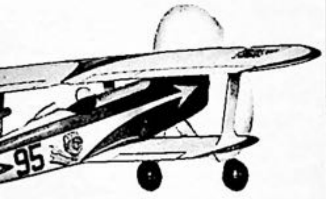
Kit S-31 BEGINNER'S MUSTANG
Wingspan 21" For .049 Engines

Kit S-32 BEGINNER'S RINGMASTER BIPE
Wingspan 21" For .049 Engines

Kit S-33 WINDER
Wingspan 42½" For .35 Engines

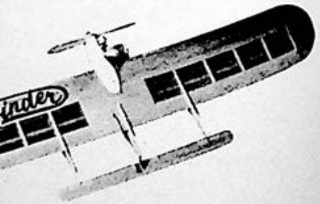


NGMASTER
gspan 42" Engines .19 to .35



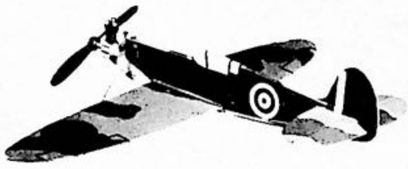
YING FOOL
gspan 34" Engines .19 to .35

PITFIRE
span 52½" Engines .29 to .35



VINDER
gspan 42½" For .35 Engines

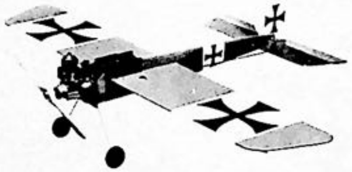
STERLING CONTROL LINE



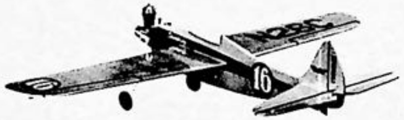
Kit S-34 **BEGINNER'S SPITFIRE**
Wingspan 20½" For .049 Engines

Kit S-35 **BEGINNER'S THUNDERJET**
Wingspan 20½" For .049 Engines

Kit S-36 **BEGINNER'S SUPER CUB**
Wingspan 20½" For .049 Engines



Kit S-37 **BEGINNER'S EINDECKER**
Wingspan 20½" For .049 Engines



Kit S-38 **BEGINNER'S SHOESTRING**
Wingspan 20½" For .049 Engines

Kit S-39 **BEGINNER'S THUNDERBOLT**
Wingspan 20½" For .049 Engines

Kit S-40 **BEGINNER'S CHEROKEE**
Wingspan 20½" For .049 Engines

LATEST ADDITIONS

(shown opposite)

S-41	FOKKER D7
S-42	HELLCAT
S-43	FOCKE WOLFE 190

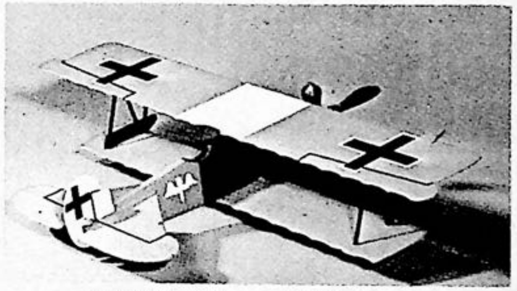
ALL BALSA BEGINNERS MODELS

If you really want to have some fun, then go out and get one or more of these nifty control line models. They're the easiest ones in the world to assemble - all wood no tissue covering - only 6 to 9 parts, depending on the model (except the Fokker which has a few more, because of the struts).

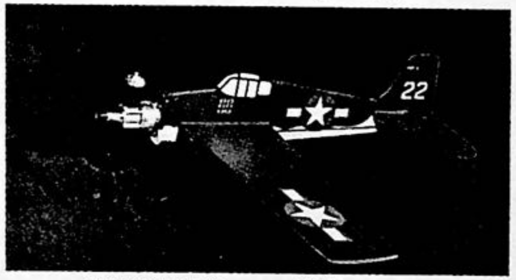
Genuine nylon motor mount ready to bolt in place - complete control system (less handle and lines), decals, landing gear, wheels, etc.; which makes building very easy and assembly literally in minutes.

You can use almost any .049 engine made (even from an abandoned plastic model, though it may need some modification). They are just perfect to learn to fly on (first time flight instruction on plans).

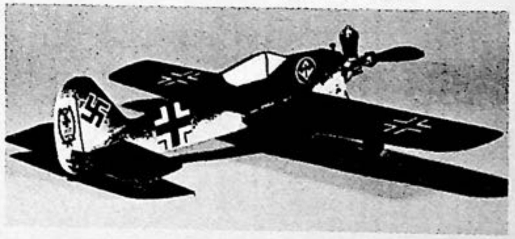
Every one of them flies extremely well - and their construction is both light and rugged. There are 13 in the line now - priced so low, you'll want to build a fleet. Wing spans are all about 21".



FOKKER D-7 - 20½" span



HELLCAT F6F - 20½" span



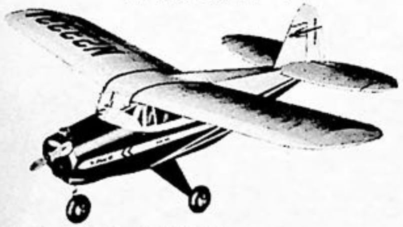
FOCKE WOLFE 190 - 20½" span

CAUTION! NEVER, NEVER fly control line models near overhead power lines or cables! Also, always make sure that your flight circle is clear of people or other obstructions before starting a flight (and don't forget to move the starter battery out of the way as well!)

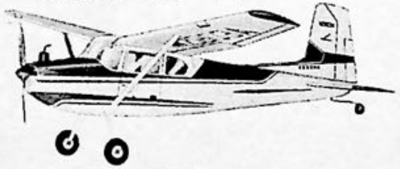
STERLING F/F and R/C

Radio control model kits made by Sterling have consistently taken top honours for many years all over the world (and most are adaptable for free flight as well). Precision engineered for ease of assembly, rugged strength and especially excellent flying qualities, they remain the favourite kits of model builders everywhere. Kits feature highest grade balsa, hardwoods, plywoods that are beautifully shaped/die cut, hardware, authentic decals, cowls, canopies, etc. etc. as are needed for each kit. Excellent easy to follow step-by-step plans to make assembly a pleasure. For beginner or expert, and the Sunday flyer, these kits were designed for you.

Note: Sterling Kits FS-1, etc., on these two pages are prefixed by B-S in the separate price list. E.g. Kit FS-1 is listed as B-SFS1.



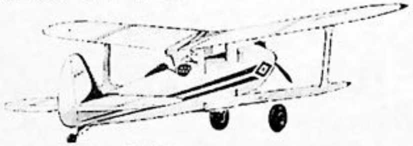
Kit FS-1 PIPER TRI-PACER
Wingspan 58¾" Engines .19 to .35



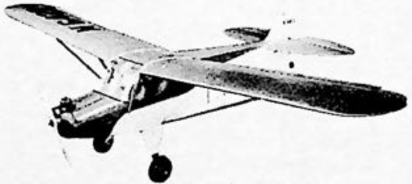
Kit FS-2, CESSNA "180"
Wingspan 45" Engines .09 to .35

Kit FS-5 FAIRCHILD PT-19
Wingspan 48" Engines .09 to .35

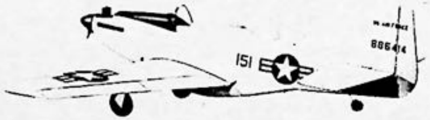
Kit FS-6 PIPER CUB J-3
Wingspan 54" Engines .09 to .35



Kit FS-7 WIZARD
Wingspan 54" Enginees .09 to .45

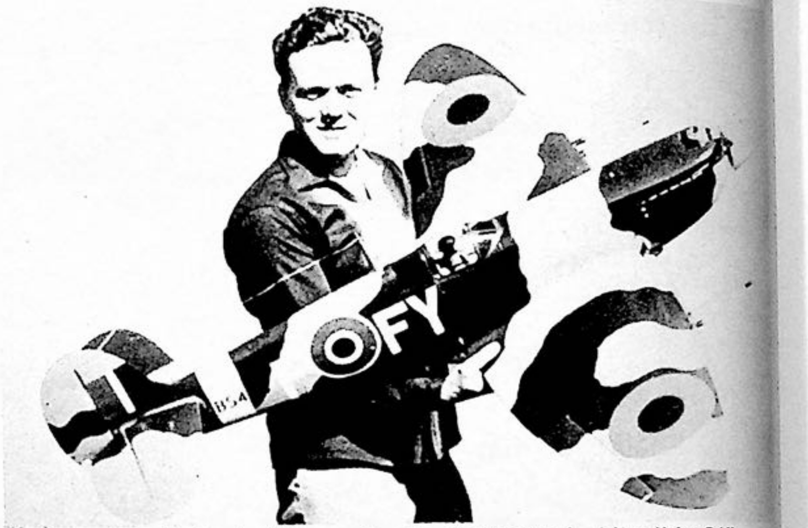


Kit FS-8 PIPER SUPER CRUISER
Wingspan 72" Engines .29 to .60

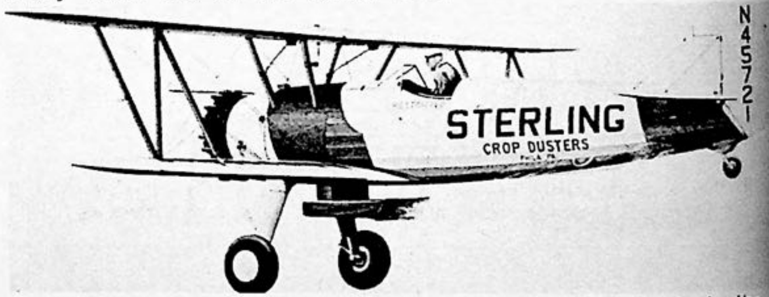


Kit FS-10 MUSTANG F-51
Wingspan 66" Engines .45 to .60

Kit FS-13 KING COBRA
Wingspan 70" Engines .45 to .60



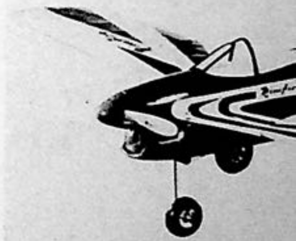
STERLING R/C Scale Kits really are giant size! Like this 64" SPITFIRE - Kit FS14 (for .45 to .60 engines). And there are even bigger models in the range. Scale masterpieces, that really stand out on the flying field.



Top of the line are two SUPER-DE-LUXE scale models in the STERLING range - the STEARMAN PT-17, cat no FS20 and the FOKKER D-VII, cat no FS21. These LARGER models faithfully duplicate even the construction of the original aircraft with scale rib, spar and stringer positions, etc. Plus EVEN MORE prefabricated parts in the kit - like spun metal cowl and dummy plastic engine in the case of the PT17; dummy cylinder and exhaust in the case of the FOKKER. If you are looking for an exhibition standard scale model - then choose one of these two.

Kit FS-22 S. E. 5a
Wingspan 40⅜" Engine

Kit FS-21 FOKKER D-VII
Wingspan 58½" Engine



RIMFIRE
span 56"
.29-.45 engines
cat no B-SFS27

A hig
recom
or 4-f
ensiv

RIPMAX

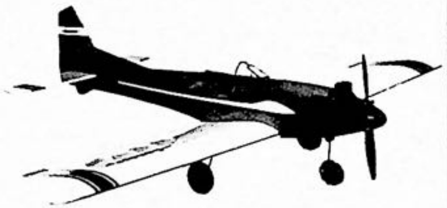
re giant size ! Like this 64"
0 engines). And there are
cale masterpieces, that
eld.

E-LUXE scale models in the
N PT-17, cat no FS20 and the
hese LARGER models faithfully
the original aircraft with scale
etc. Plus EVEN MORE
e spun metal cowl and dummy
PT17; dummy cylinder and
ER. If you are looking for an
then choose one of these two.

RIPMAX

STERLING F/F and R/C

Kit FS-22 S. E. 5a
Wingspan 40⅜" Engines .19 to .35



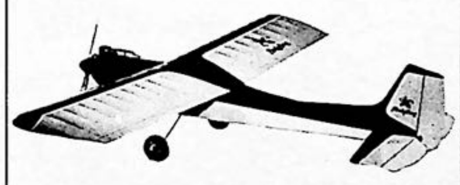
Kit FS-25 LANCER
Wingspan 53½" Engines .35 to .51

Kit FS-28 SCHWEIZER 1-26D
Wingspan 70" Area 500 Sq. In.

Kit FS-30 LANCER SL-62
Wingspan 62" Engines .56 to .60

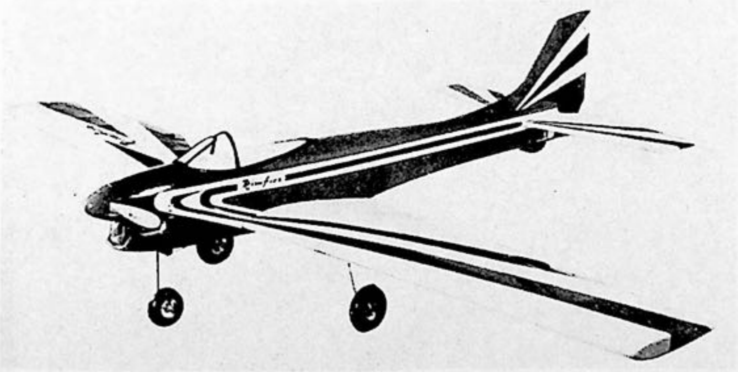
Kit FS-21 FOKKER D-VII
Wingspan 58½" Engines .45 to .70

Kit FS-26 SCHWEIZER 1-34
Wingspan 98½" Area 615 Sq. In.



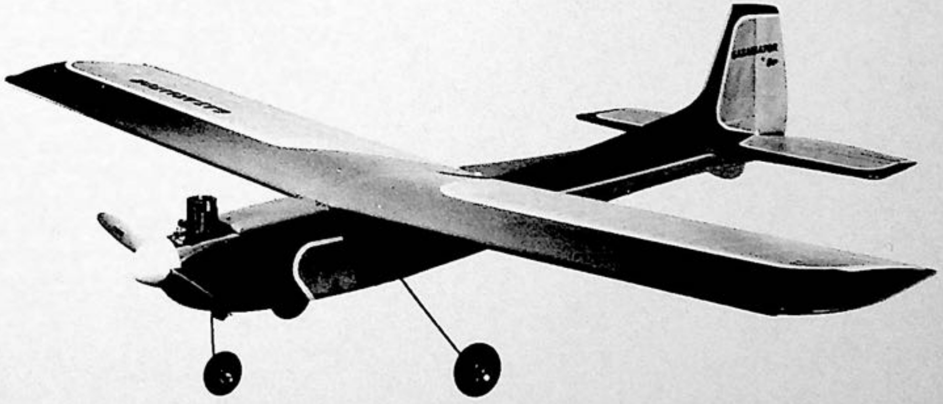
Kit FS-29 FLEDGLING
Wingspan 56" Engines .23 to .40

Kit FS-31 CITABRIA
Wingspan 54" Engines .23 to .35



RIMFIRE
span 56"
.29-.45 engines
cat no B-SFS27

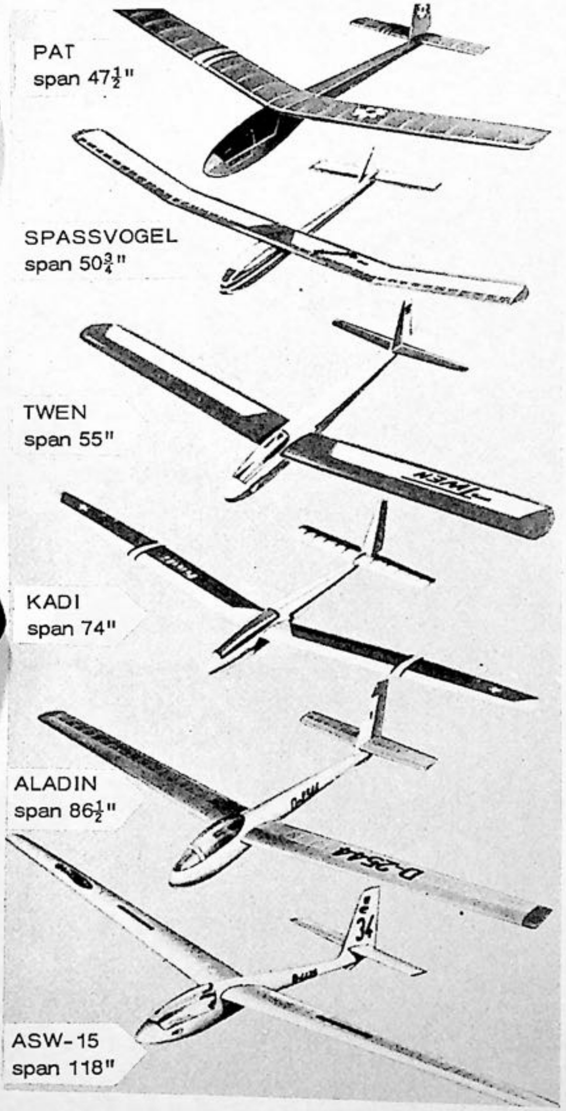
A high performance original design highly recommended for use with lightweight 3- or 4-function proportional radio. Kit is extensively prefabricated with die-cut parts, etc.

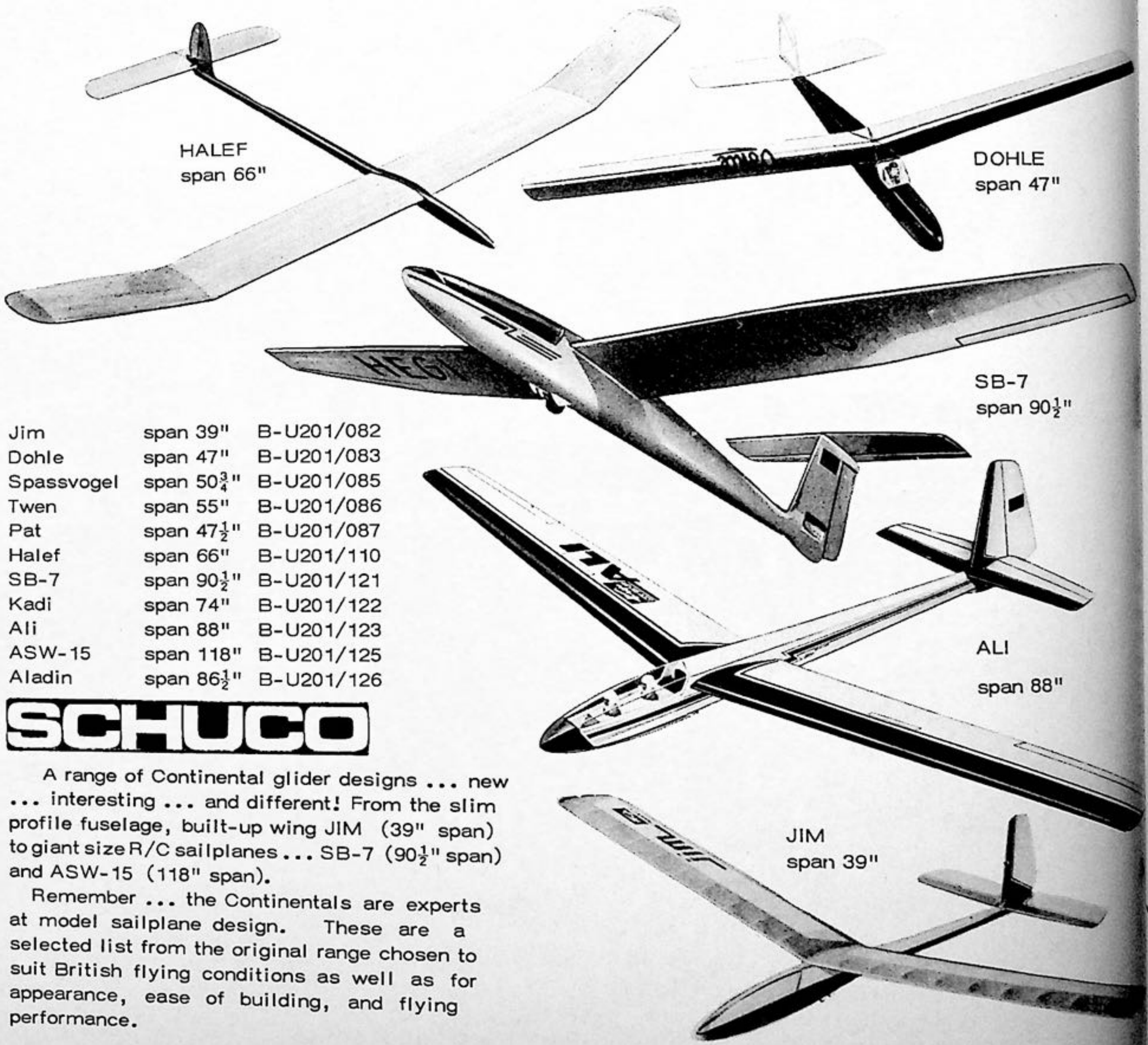


GAZARIATOR
span 68"
wing area 800 sq. in.
cat no B-SFS32

A big new sports model for .60 engines. Good looking, easy to build, ideal as a trainer. Complete wing is built flat to eliminate warps. Strip ailerons. Torsion main landing gear and sprung nosewheel. Plenty of room for any R/C equipment.

SCHUCO GLIDERS



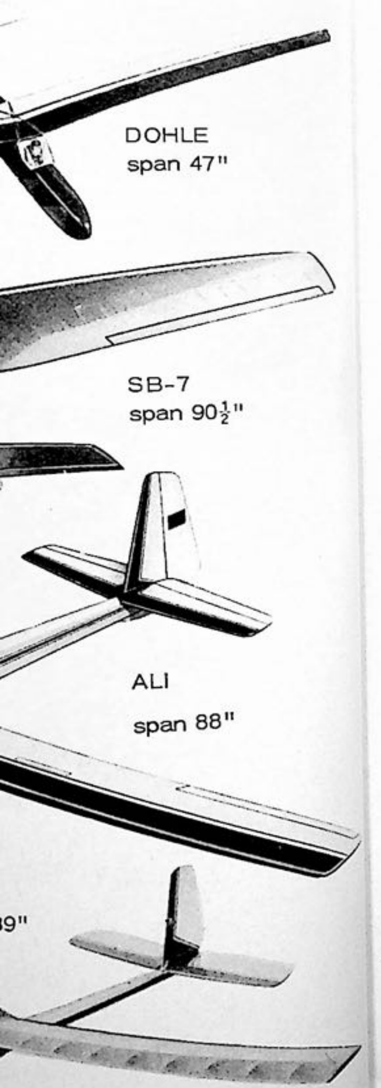


Jim	span 39"	B-U201/082
Dohle	span 47"	B-U201/083
Spassvogel	span 50¾"	B-U201/085
Twen	span 55"	B-U201/086
Pat	span 47½"	B-U201/087
Halef	span 66"	B-U201/110
SB-7	span 90½"	B-U201/121
Kadi	span 74"	B-U201/122
Ali	span 88"	B-U201/123
ASW-15	span 118"	B-U201/125
Aladin	span 86½"	B-U201/126

SCHUCO

A range of Continental glider designs ... new ... interesting ... and different! From the slim profile fuselage, built-up wing JIM (39" span) to giant size R/C sailplanes ... SB-7 (90½" span) and ASW-15 (118" span).

Remember ... the Continentals are experts at model sailplane design. These are a selected list from the original range chosen to suit British flying conditions as well as for appearance, ease of building, and flying performance.



DOHLE
span 47"

SB-7
span 90½"

ALI

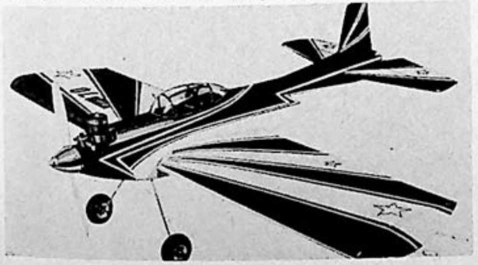
span 88"

9"

SCHUCO AIRCRAFT

The model shown in the photograph above is the T-45.

HEGI 70 cat no B-U201/181
Specially recommended if you are looking for a stunt control-liner which readily performs the full FAI schedule - and more! Such a beautifully balanced model that it makes an advanced trainer as well as a contest model. Or you can fly this thoroughbred stunter just for sheer flying fun. Span 39¾" (1010mm) and suitable for powering by engines up to 29 size. Fully aerobatic on a good .19.

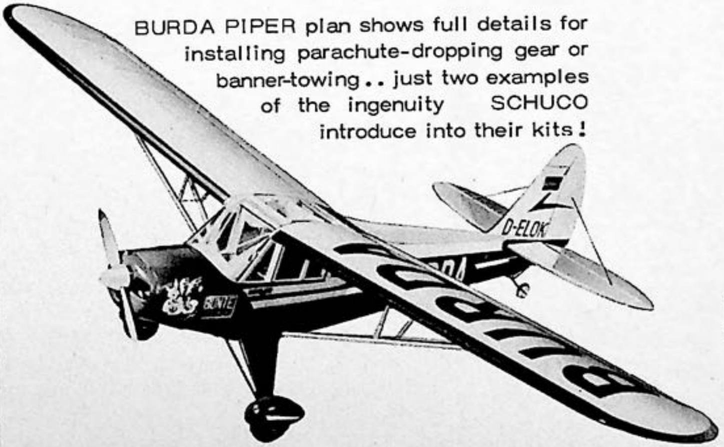


Presenting a range of R/C power models that really are different, like the T-45, for example (opposite). A sports model with a top aerobatic performance on 29 or 35 engines - which has all the realistic appearance of a scale job. Or the LEAR JET (for 60 engines) which really is true scale (except for being prop powered).

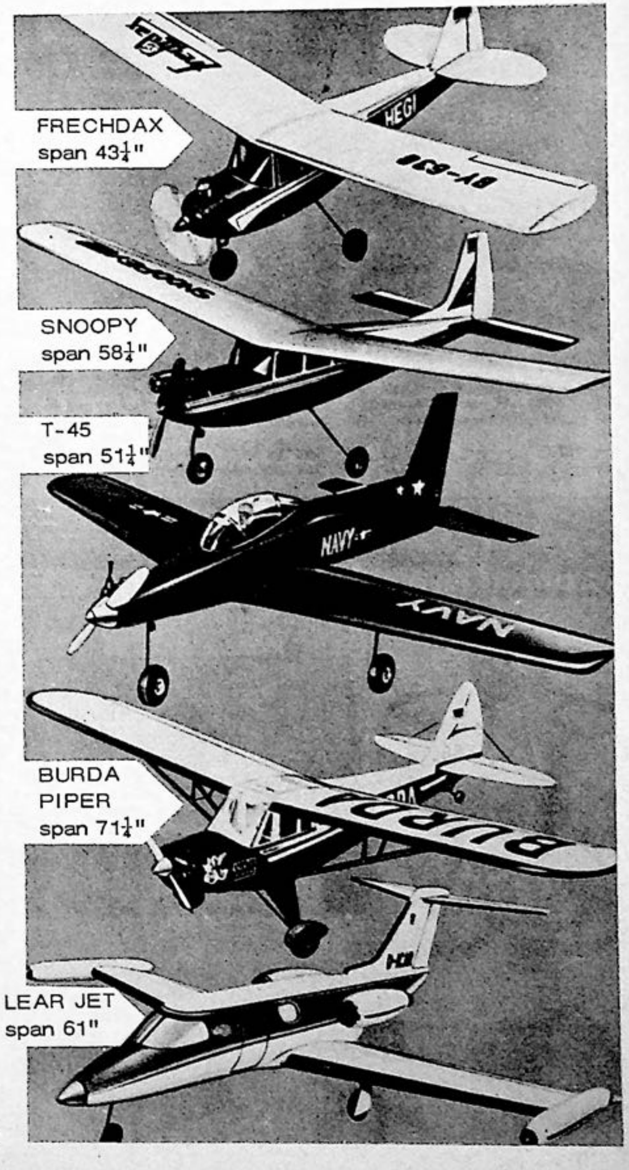
Then again, if you are a scale enthusiast, the BURDA PIPER is an outstanding model in this class. A large model (71¼" span) which looks completely realistic - on the ground or in the air.

To top the line off there are two freelance semi-scale designs - the FRECHDAX for engines up to 1.5cc diesel or .19 glow; and SNOOPY for engines up to .29 glow.

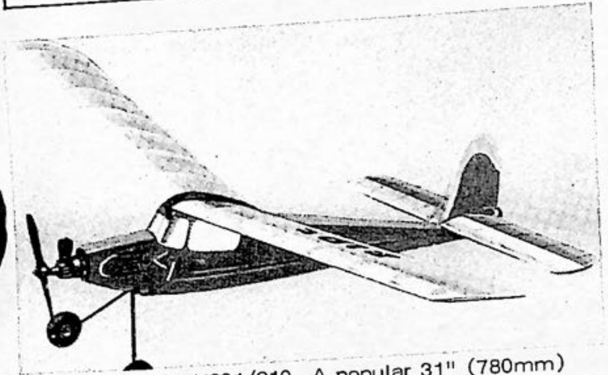
FRECHDAX	span 43¼"	cat no B-U201/233
SNOOPY	span 58¼"	cat no B-U201/235
BURDA PIPER	span 71¼"	cat no B-U201/240
LEAR JET	span 61"	cat no B-U201/241
T-45	span 51¼"	cat no B-U201/242



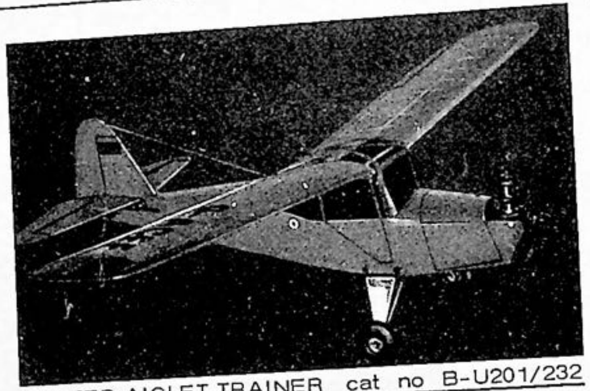
BURDA PIPER plan shows full details for installing parachute-dropping gear or banner-towing.. just two examples of the ingenuity SCHUCO introduce into their kits!



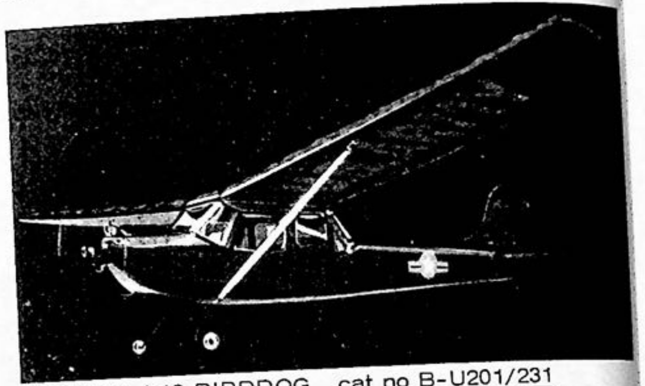
SCHUCO



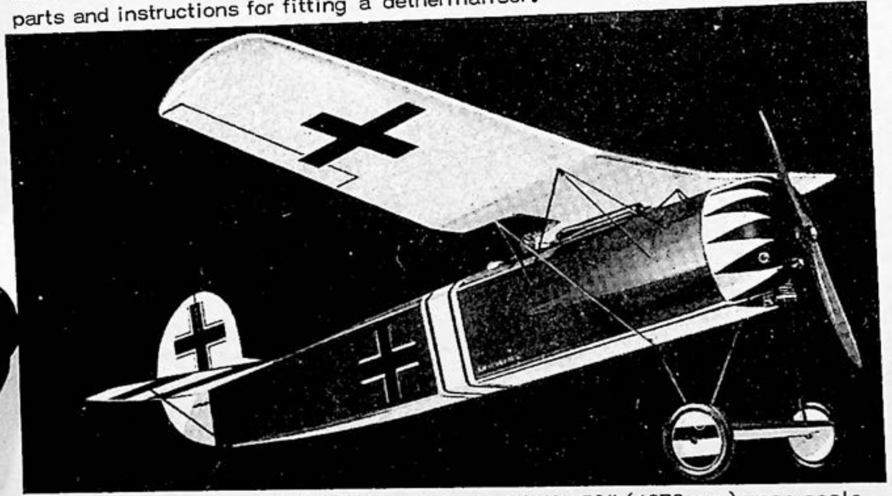
FIPSI cat no B-U201/210 A popular 31" (780mm) span cabin free flight model for radially mounted engines (up to 0.5cc diesel or 049 glow). Simple construction with built-up tissue covered wings and tail. Rubber sprung landing gear. Kit includes parts and instructions for fitting a dethermaliser.



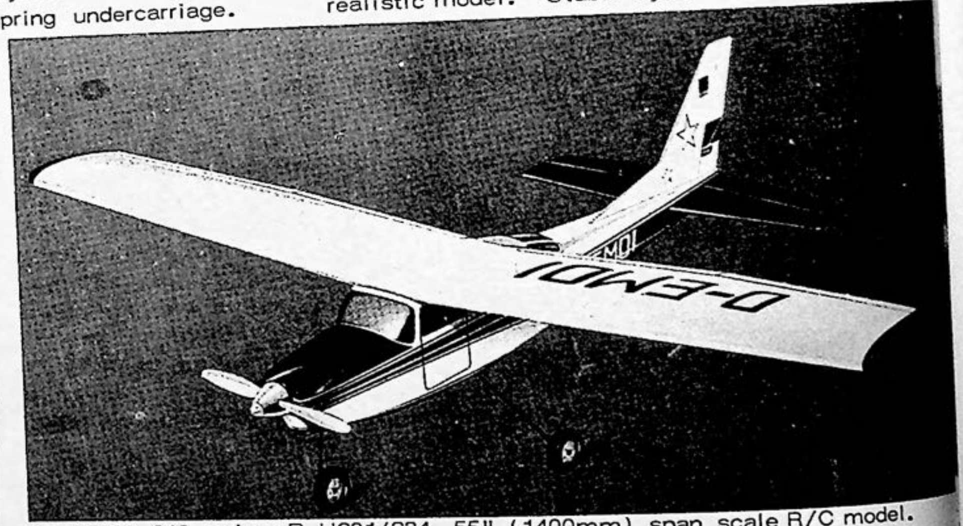
AUSTER AIGLET TRAINER cat no B-U201/232 Realism with simple construction. This 47" (1200mm) span scale model is designed for engines up to 3.5cc either for free flight or radio control (rudder only, but you can add elevators and aileron). Rubber spring undercarriage.



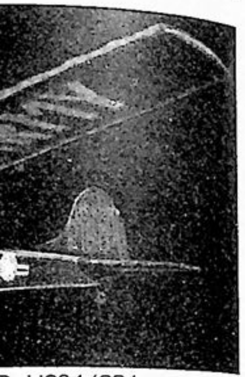
CESSNA L19 BIRDDOG cat no B-U201/231 47" (1200mm) span, designed for engines up to 1.7cc - either as a free flight model or rudder/throttle R/C (elevator and aileron control can be added). Easy to build kit which makes up into a most realistic model. Stable flyer.



FOKKER D-8 cat no B-U201/230 A most realistic 50" (1270mm) span scale model designed for flying with multi function radio control. Clever 'crashproof' wing mounting and simple wire undercarriage (wire parts preformed). Motor is partially enclosed in an authentic cowl giving the appearance of a genuine rotary engine. Recommended engine size .19 to .40 glow.



CESSNA 210 cat no B-U201/234 55" (1400mm) span scale R/C model. Suitable for .19 to .40 glow engines. Flying weight (with radio gear) approximately 4 lbs. 3- or 4-function radio recommended. A lot of trouble has been taken with this kit to produce a model that is easy to build, looks really authentic, and is a joy to pilot!



B-U201/231
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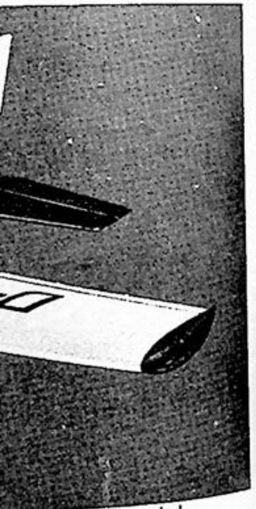

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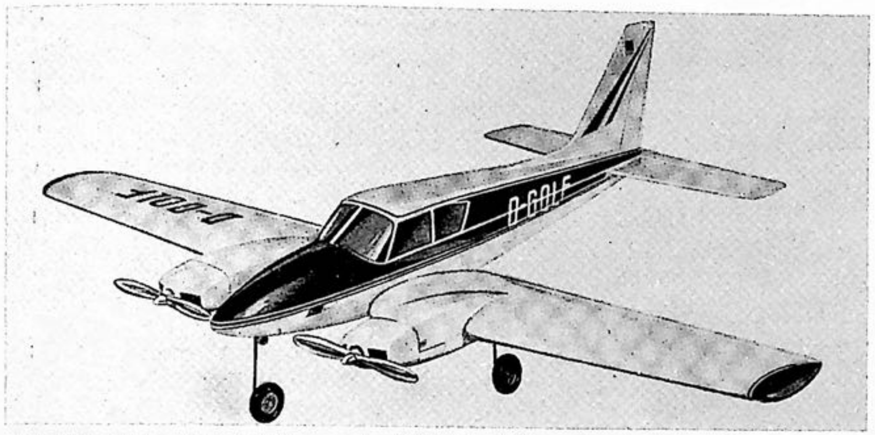
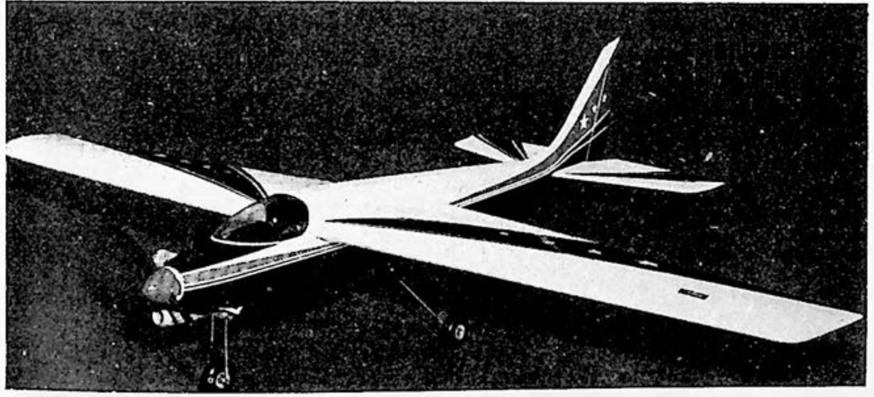


PIPER TWIN COMANCHE
cat no
B-U201/239

Sleek flying scale TWIN for R/C enthusiasts! Wing span 59" (1500mm). Flying weight (with motors) approximately 4 lbs. Recommended engine size - twin 2.5 or 3.5cc diesels or twin .19 glow. A model just made for modern proportional radio using rudder, elevator, ailerons and throttle controls.



SKYLAB
63" Span
cat no
B-U201/243

'60' size pattern R/C model. Highly developed aerodynamic design with wing anhedral gives stable performance and handling over a wide speed range. Kit includes moulded fibreglass fuselage, with formed tail unit, prefabricated and stamped wood parts, steerable nosegear and ready-made main landing gear (less wheels) and a host of other detailed parts.

TRIMMING R/C MODELS

Proceed with common sense and care. Try to secure the help of an assistant. Prior to the first launching check the engine for smooth running at all attitudes. Then check the proper functioning of the R/C gear with running engine (use controls singly and simultaneously).

Select a suitable flying field for your first attempts at flying the model; the field should permit a rise of ground take-off and provide ample space, both on the ground and in the air, for your model. For test flying R.O.G. takeoffs are safest. Launch the model against the wind. For initial flights make it a standing rule:

> Do not try any manoeuvres, but correct the attitude of the model only. Refrain from steering the model near the ground, unless the model is in danger; operate controls cautiously, with minimum movement of control surfaces.

Initial flights should mainly serve for observations and help you find out whether the model flies in a normal manner when unaided by remote control. All 'propo' equipment permits in-flight trimming of a model, that is: the correction of faults is possible. But trimming is not meant to be a cure-all for warps. Any warps that may be present, must be permanently removed. Anyone who has not yet acquired adequate skill in piloting R/C models is well advised to secure the help of an experienced R/C flyer.

Start aerobatics with simple manoeuvres, such as inside loops, and permit your model to climb to a safe height before you attempt any stunts! You'll soon get more and more familiar with your model after each flight. But before you'll really master the model and all the manoeuvres you'll have to practice, practice, practice! Sorry, there's no easy way out, but all the other chaps have to learn it that way, too.

TOPFLITE
R/C

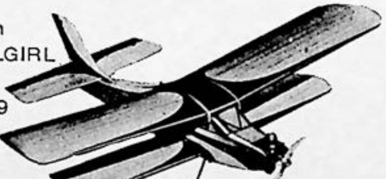
R/C COMPACTS...

Designed by past American R/C champion Ken Willard and featuring lightweight all-sheet balsa construction. All parts accurately die-cut - plus spars, hardware, etc. and elaborately detailed plans.

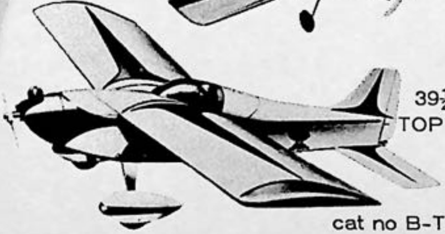
29" span
SCHOOLBOY
cat no B-TFRC3

39" span
SCHOOLMASTER
cat no B-TFRC8

48" span
HEADMASTER
cat no B-TRFC11



32" span
SCHOOLGIRL
BIPE
B-TFRC9

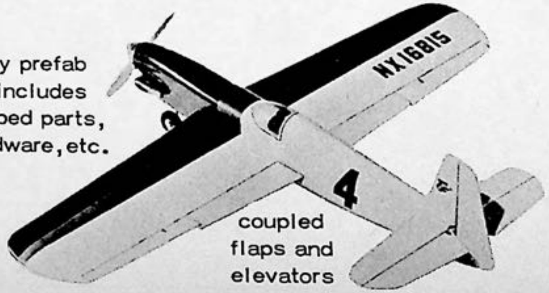


39½" span
TOP DAWG
cat no B-TFRC10

S.E.5A BIPE 53" span EXACT scale model by Dave Platt. Kit includes shaped airfoil section struts, stamped metal cowls, die-cut and moulded balsa parts, all nylon fittings and metal parts, etc. Cat no B-TFRC13.

CONTENDER 54" span
cat no B-TFRC 15. Sleek, scale-type fully aerobatic model that allies realism to superb performance! Super-prefabricated kit includes die-cut and shaped balsa and ply parts, hardware. So very quick to build.

R/C NOBLER 51" span cat no B-TFRC14
In redesigning the world-famous C/L Nobler for R/C, George Aldrich has retained the smooth and precise manoeuvreability of the original.



Fully prefab kit includes shaped parts, hardware, etc.

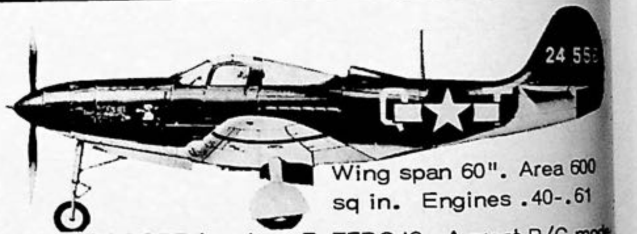
coupled flaps and elevators

STAND OFF SCALE

Easier to build, easier to fly than exact scale models - but every bit as realistic! You can go on adding even more working features, like retracts and working flaps,

Wing span 60". Engines .40-.61 Weight up to 7lb. with gear.

P-40 WARHAWK cat no B-TFRC17
It really looks like a true scale model, and delivers the flying performance of a thoroughbred. Easy to build, too.



Wing span 60". Area 600 sq in. Engines .40-.61

P-39 AIRACOBRA cat no B-TFRC18 - A great R/C mode subject with real pattern performance. You can fit it wit retract gear, flaps, etc. or build it without frills.

Wing span 60". Engines .40-.6

P-51 MUSTANG cat no B-TFRC16 - Really authentic look and the building ease of a sports R/C model from this superb prefabricated kit. Weight up to 7lb with gea

AND OFF SCALE

ier to build, easier to fly than
models - but every bit as
can go on adding even more
like retracts and working flaps.

span 60". Engines .40-.61
t up to 7lb. with gear.

WARHAWK cat no B-TFRC17
cale model, and delivers the
roughbred. Easy to build, too.

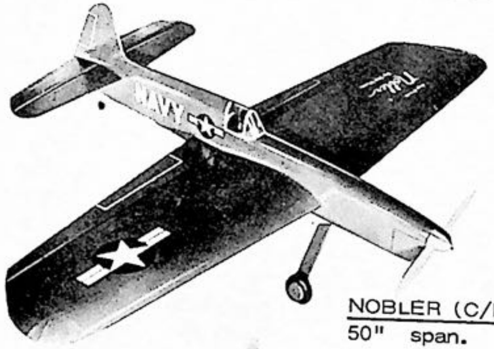
Wing span 60". Area 600
sq in. Engines .40-.61

B-TFRC18 - A great R/C model
erformance. You can fit it with
or build it without frills.

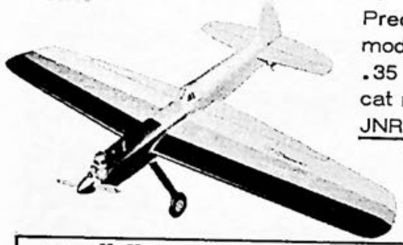
an 60". Engines .40-.61
FRC16 - Really authentic
f a sports R/C model from
. Weight up to 7lb with gear.

RIPMAX

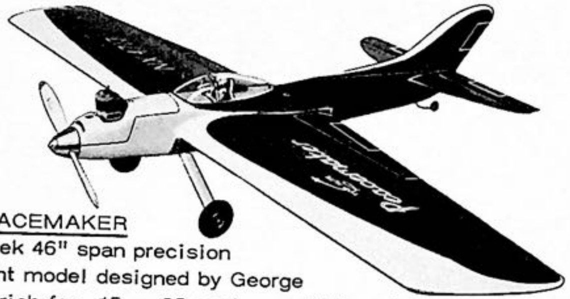
TOPFLITE C/L



NOBLER (C/L)
50" span. Precision stunt model for .19-.35 engines. cat no B-TFN1

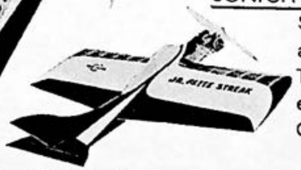


JNR. NOBLER
40" span. (.15-.29 engines). B-TFN6



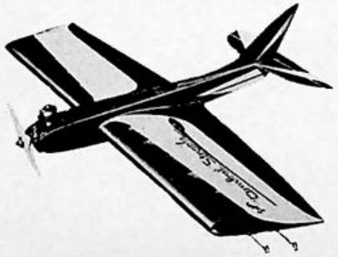
PEACEMAKER
Sleek 46" span precision stunt model designed by George Aldrich for .15 - .35 engines. 414 sq ins wing area. Really smooth to fly! De luxe kit with preformed and die-cut parts, plus hardware, etc. Cat no B-TFN7

FLITE STREAK
American Nationals COMBAT winner, span 42", wing area 390 sq in. Takes .15 - .35 engines. Cat no B-TFN2.



JUNIOR FLITE STREAK
Span 31". Wing area 230 sq in. Takes .09 to .29 engines. Cat no B-TFN3.

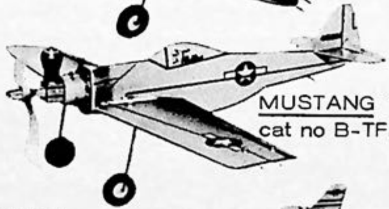
BABY FLITE STREAK
145 sq ins wing area. Span 24½". Engines .049 - .099. Cat no B-TFN4.



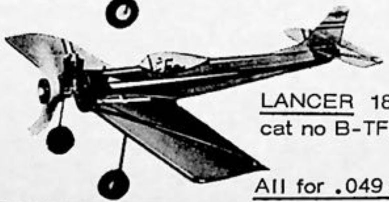
COMBAT STREAK
Rugged, built-up fuselage construction. 390 sq in area. Span 42". Engines .19 - .35 Cat no B-TFN5.

1/2"A" PROFILES

SPITFIRE 18" span
cat no - B-TFP02



MUSTANG 18" span
cat no B-TFP03

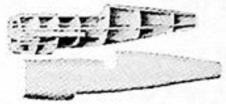


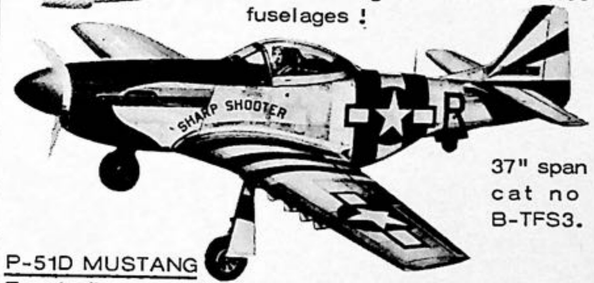
LANCER 18" span
cat no B-TFP01

All for .049 engines.

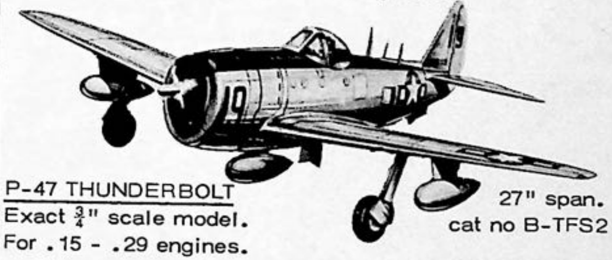
SUPERFORM

These kits feature preformed balsa fuselage halves which fit together perfectly for smooth external surface with minimum weight. No more shaping and sanding planked or block fuselages !





P-51D MUSTANG
37" span
cat no
B-TFS3.
Exact 1" scale model kit comes complete with formed landing gear, canopy, hardware, wheels, authentic decals. For .19-.35 engines.



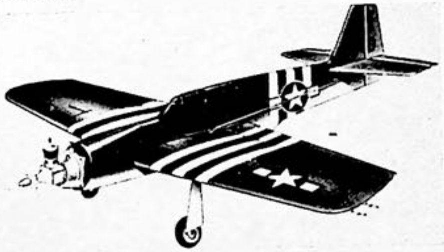
P-47 THUNDERBOLT
27" span.
cat no B-TFS2
Exact ¾" scale model.
For .15 - .29 engines.

P-40 WARHAWK 28" span. Cat no B-TFS1
Exact ¾" scale. Matches .15-.29 engine sizes. Kit includes formed landing gear, canopy, decals, and complete hardware (including wheels).

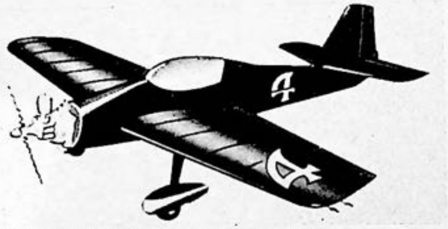
TOPFLITE KITS

JUNIOR ACES

Very realistic in appearance - and extremely easy to build - these profile fuselage models are stuntable as well as being suitable for racing or combat. Kit includes shaped and die-cut balsa and ply parts, shaped landing gear and hardware.



MUSTANG P-51B - cat no B-TFN11
24" span. Power by any .049 glow motor.



COSMIC WIND - cat no B-TFN12
24" span. Power by any .049 glow motor.

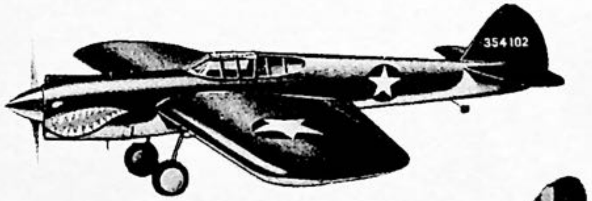
HAWKER HURRICANE - cat no B-TFN13
24" span. Power by any .049 glow motor.

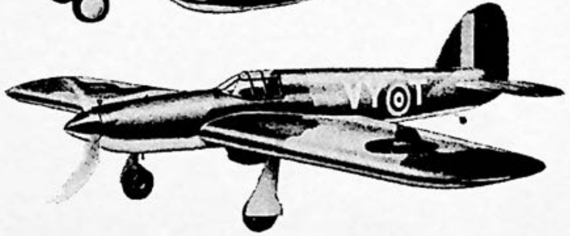
FORMFLITE semi-scale

'Formflite' construction features pre-formed moulded balsa fuselage shells which cut building time in half! Conventional wing construction and sheet tail surfaces - all parts die-cut for easy and accurate assembly.

These two models are designed for fully aerobatic stunt performance on .15 - .35 engines - stunt models with a semi-scale performance. Wing span 42".

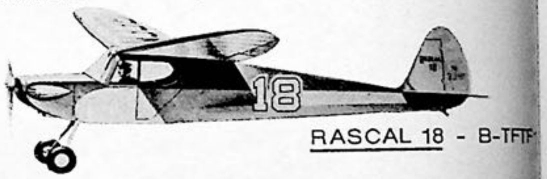
P-40 TIGER SHARK - cat no B-TFS50
HAWKER HURRICANE - cat no B-TFS51





18" span RUBBER POWERED

Fully prefabricated kits with 'JIGTIME' construction. No cutting ... no sanding ... no tools needed, just cement. Average building time about one hour. All models are 18" wing span. Kit includes plastic prop and rubber motor, etc.



RASCAL 18 - B-TFTF

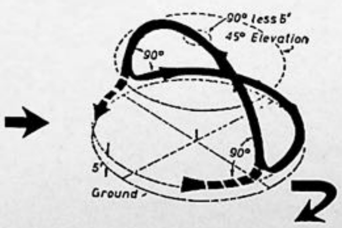
PIPER VAGABOND - B-TFTF2

STINSON RELIANT - B-TFTF

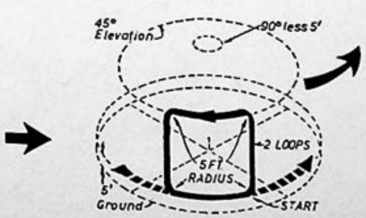
STUNTS...

Here are three standard aerobatic manoeuvres. The WINGOVER is simple - the two loops are quite advanced. More stunts are shown on pages 26 & 27.

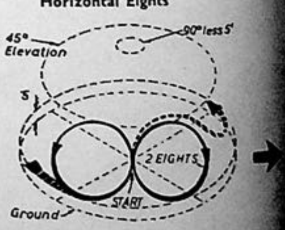
Reverse Wing Overs



Inside Square Loops



Horizontal Eights



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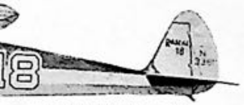
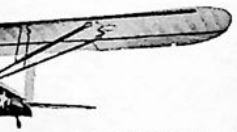


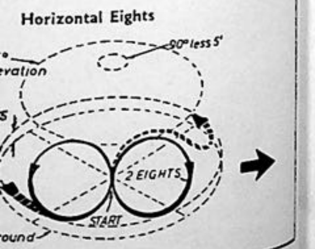
RASCAL 18 - B-TFTF1

-TFTF2



INSON RELIANT - B-TFTF3

WINGOVER is simple
own on pages 26 & 27.



MODERN MATERIALS

The traditional material for building model aircraft is Balsawood - ever since it was first introduced to modellers around 1930. There is no other wood that compares with Balsa for strength/weight ratio - or the ease with which it can be cut or shaped.

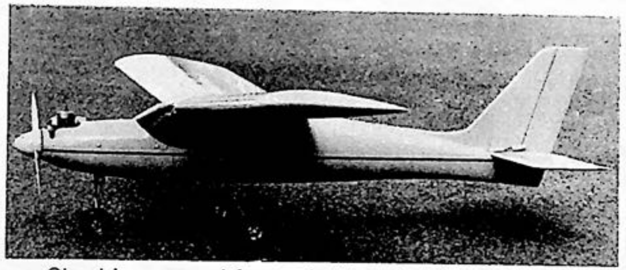
Balsa is still the 'standard' material for airframe construction in models of all sizes - and especially to built-up frameworks subsequently covered with tissue, nylon, or even balsa sheet. Where weight is not a critical factor, more 'solid' type balsa construction can be used - fuselage sides and tailplane parts cut from balsa sheet, for example.

Modern technology has also evolved other suitable lightweight materials for model aircraft construction. Expanded polystyrene or 'foam plastic' is an outstanding example. This can be made much lighter than solid balsa but, although reasonably rigid, lacks strength.

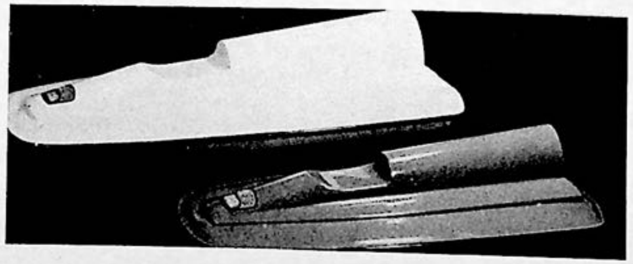
Complete models have been produced with foam plastic components, with varying success. The most useful application of foam plastic is as wing cores, subsequently covered with hardwood veneer (e.g. obechi) or thin balsa sheet. This covering adds rigidity and strength in taking bending loads, as well as producing a surface which can be sanded down smooth. The great advantage of foam plastic wing cores is the considerable saving in construction time - especially as most modern kits supply wing cores to exact shape ready veneered. All that is necessary is to join the wing halves and glue the tips - and the whole wing is completed ready for final finishing.

For more complex shapes, particularly fuselages, tougher and denser plastic materials can be used which can be moulded to finished shells ready for joining together (or in some cases completely finished fuselages). Various sheet plastic materials are used in this way - ABS being a particularly favoured material because of its good rigidity. Other plastic shells can be produced by injection moulding. However, this is a more expensive technique.

Graupner Bell 212 Helicopter features moulded glassfibre fuselage and other prefabricated parts.



Obechi-veneered foam plastic wings, 'Trithane' fuselage moulding and other fully shaped parts make this model really quick and easy to assemble. The strength of 'Trithane' makes it virtually crash-proof - the ideal R/C trainer for beginners. CAMBRIA DRAGONFLY - see page 15.
(Below) RIPMAX-SHG HULL & DECK mouldings in glassfibre set a world standard in design and excellence of finish.



The strongest of all the plastic materials for 'shell' construction is glassfibre. Again production is expensive, but the results can be superb - both from the point of view of appearance and strength. However, glassfibre mouldings have one disadvantage. They are relatively heavy. As far as aircraft are concerned, this mainly confines the use of glassfibre mouldings to helicopter fuselages and larger R/C kits. For boat hulls, though, glassfibre is superb - as exemplified by the Ripmax-SHG range of hulls. But other moulded plastics are equally suitable here, especially for long production runs. Many Graupner and Schuco kits are examples of the best model hull moulding techniques in 'solid' plastics.

The very latest in plastic mouldings is 'Trithane' - a British development used in Cambria kits. 'Trithane' is quite unique - basically a foamed plastic moulding with a 'hard' skin, and reinforced with glassfibre where necessary. It represents a very advanced technique, mouldings being produced in heated, metal moulds, ensuring absolute accuracy of reproduction. 'Trithane' mouldings can also be produced in quite complex shapes, i.e. complete one piece fuselage mouldings.

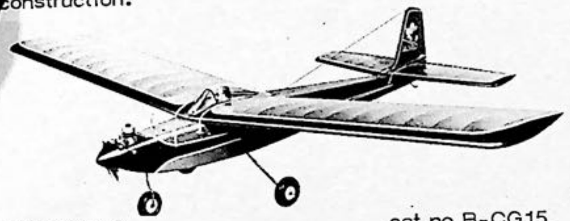
'Trithane' offers the advantages of high strength and superior surface finish, with lightness - ideal for aircraft fuselages, for example. So strong is the moulding it is virtually crashproof. And if a crack does occur in a really bad crash, it can easily be repaired on the spot with 5-minute Epoxy adhesive. If the 'Trithane' moulding does need reworking it cuts - and sands - like wood.

Modern technology has also improved the range of materials available for accessories. Like self-coloured fuel-resistant 'Solarfilm' for instance - for applying covering and finish to a model in one operation. And giving an exhibition standard high gloss finish. Many modellers, however, still prefer the traditional covering-and-doping method of finishing. Here again there are now superior dopes available which are really hot fuel proof - like 'Aerogloss'.

GOLDBERG
R/C

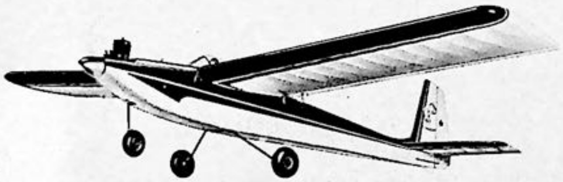
THE FLYING FALCONS

More Falcons have been built and flown in the past 10 years than any other R/C. Your best bet for value and features in a functional, rugged aeroplane. FEATURES: All de luxe, with top quality fittings, coil-sprung nose ear ... formed main gear. Cleanly die-cut ribs, fuse ides, formers, etc. Shaped and notched leading and ailing edges. New simple "Symmet-TRU" wing onstruction.



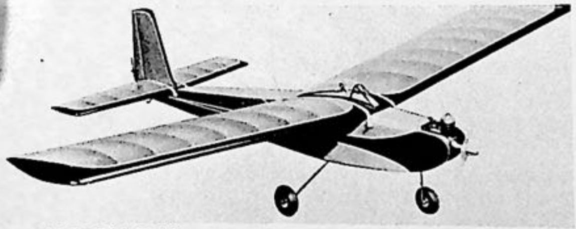
FALCON 56 cat no B-CG15

The medium-size trainer. Takes single to 4-channel proportional. Rudder-only or multi-training. Span 56". For .15 -.35 engines.



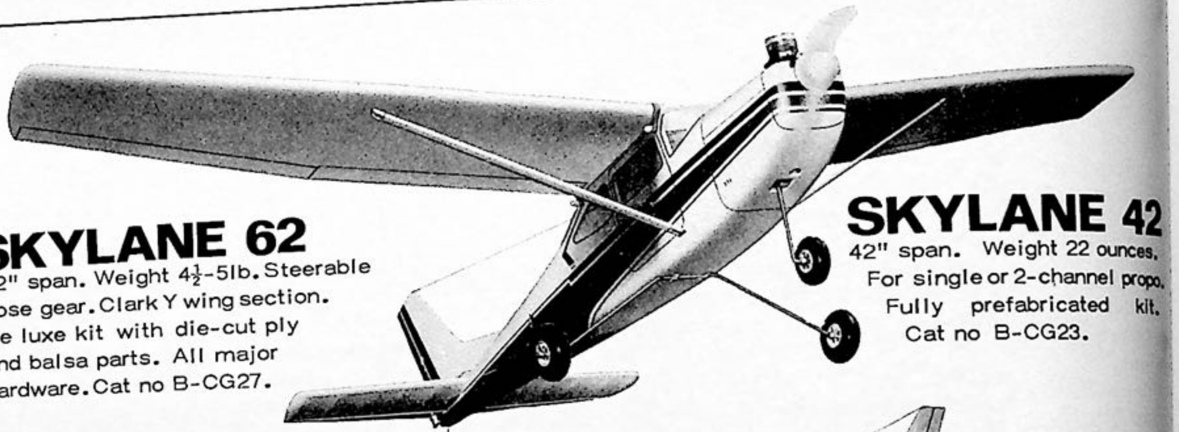
SENIOR FALCON cat no B-CG16

The standard big trainer. For 4-channel propo. Span 69". For .35 to .60 engines.



JUNIOR FALCON cat no B-CG18

The small trainer. For single or 2-channel, pulse or propo. Span 37". For .049 engines.



SKYLANE 62

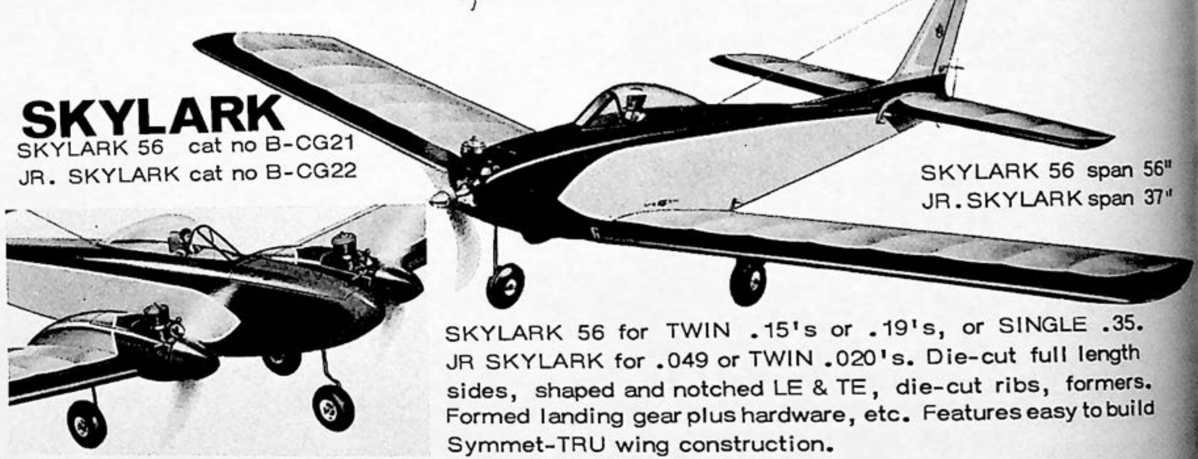
62" span. Weight 4½-5lb. Steerable nose gear. Clark Y wing section. De luxe kit with die-cut ply and balsa parts. All major hardware. Cat no B-CG27.

SKYLANE 42

42" span. Weight 22 ounces. For single or 2-channel propo. Fully prefabricated kit. Cat no B-CG23.

SKYLARK

SKYLARK 56 cat no B-CG21
JR. SKYLARK cat no B-CG22

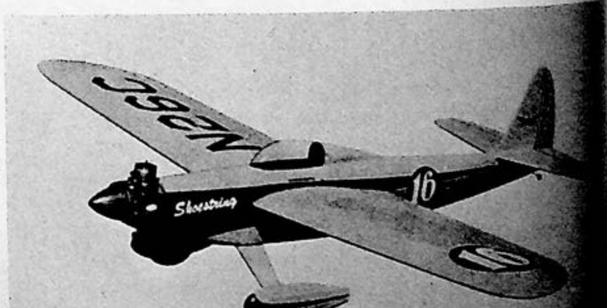


SKYLARK 56 span 56"
JR. SKYLARK span 37"

SKYLARK 56 for TWIN .15's or .19's, or SINGLE .35. JR SKYLARK for .049 or TWIN .020's. Die-cut full length sides, shaped and notched LE & TE, die-cut ribs, formers. Formed landing gear plus hardware, etc. Features easy to build Symmet-TRU wing construction.

SHOESTRING...

The Goodyear racer with enough area and stability so you can fly it! For 4-channel proportional. Span 54"; area 540 sq in; weight 4½-5lbs. For .19 - .40 engines. FEATURES: shaped leading edges plus sheeting. Symmet-TRU wing construction. Full length sides, sheeted trailing edges. Cleanly die-cut ribs, formers, etc. Formed spring aluminium landing gear. Semi-symmetrical wing section. Cat no B-CG26.



LI'L WIZ
die-cut f
engines.

SWORDS
balsa. 18
.049 engi

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cat no B-

FR

RANGER
30" span,
Cat no B-

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23.

span 56"
span 37"

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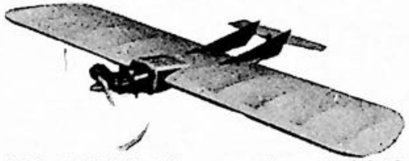
RIPMAX

GOLDBERG F/F and C/L

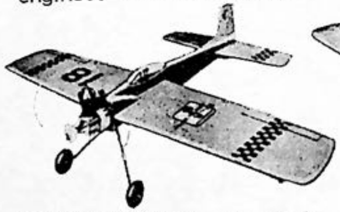
LI'L WIZARD - shaped balsa wing, die-cut fuselage, 21" span for .049 engines. Cat no B-CG5.



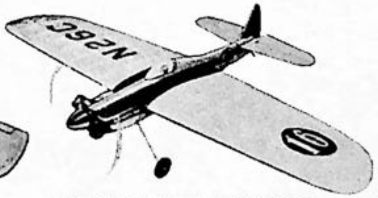
LI'L SATAN 19" span cat no B-CG12

JNR SATAN 29" span cat no B-CG20

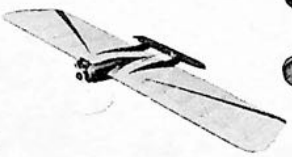
P-40 FLYING TIGER - 18" span all-balsa pre-fab for .049 engine. Cat no B-CG11.



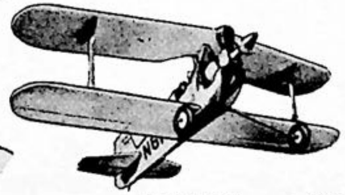
SWORDSMAN 18 - die-cut balsa. 18" span, for .020-.049 engines. Cat no B-CG3



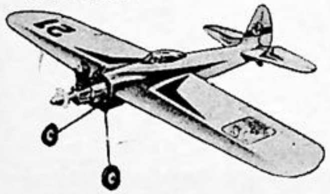
SHOESTRING STUNTER 42" top stunt model for .19-.35 engines. Cat no B-CG9.



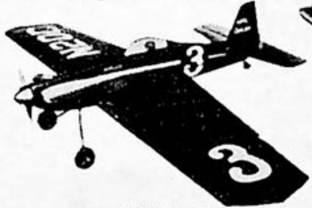
RILEY WOOTEN VOODOO 36" combat-stunt for .19-.35 engines. Cat no B-CG13



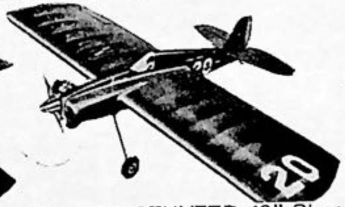
LITTLE TOOT 16" span bipe for .049 engine, all die cut balsa. Cat no B-CG4.



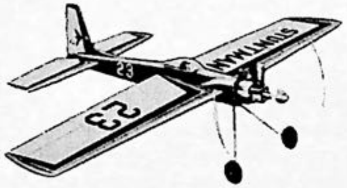
LI'L JUMPING BEAN 21" Span. For .049 engine. cat no B-CG8.



COSMIC WIND 43" span for .19-.35 engines. Cat no B-CG17.

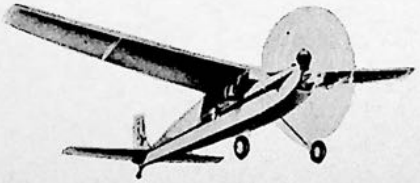


BUSTER STUNTER 40" Sharp stunt model for .19-.35 engine. Cat no B-CG14.

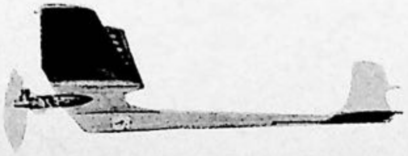


STUNT MAN 23 Die-cut balsa, 23½", for .049-.09 engine. Cat no B-CG6.

FREE FLIGHT...



RANGER 30 - Die-cut balsa. 30" span, for .010-.049 engines. Cat no B-CG2.

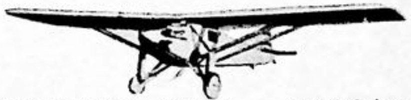


½ A HI-THRUST VIKING 48" span, for .049-.051 engines. Cat no B-CG10.

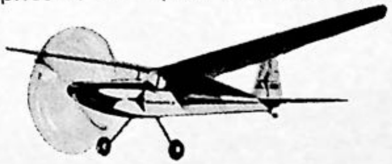
½ A BLAZER - die-cut balsa, 40" span, for .049 engines. Cat no B-CG1.

RUBBER POWER

CESSNA 180 - the champion of business liners, 21" span. Cat no B-CGD4.



SPIRIT OF ST. LOUIS - A miniature duplicate. 21" span. Cat no B-CGD1.



RANGER 21 - all die-cut balsa parts. 21" span beauty. Cat no B-CGD3.

SHOESTRING RACER - 18" span. All die-cut balsa. Cat no B-CGD2.

RANGER 28 - 28" span. Simplified built up construction. Cat no B-CGD5.

Ten years ago radio-controlled model helicopters were thought 'impossible'. Today they are a practical reality. An R/C helicopter (Graupner Bell 212) has flown the English Channel. And a Schuco Bell Huey Cobra has flown the Solent (Ryde to Southsea).

Something excitingly new has emerged in R/C modelling - the chance to become a helicopter pilot!

RADIO CONTROLLED HELICOPTERS

by MIKE YOUNG

Before the final choice of helicopter to be built is made the builder should endeavour to see, if possible, the various types flying and talk to as many model helicopter pilots as possible. There are two main types of model helicopter rotor systems:-

(1) Collective pitch - where the pitch of each blade is changed to vary the lift, the engine speed remains almost constant regardless of the pitch control used to gain or lose height - or hover.

(2) Non-collective pitch - here the pitch of each blade is fixed so that at approximately half throttle the model starts upward lift for climb or reduce lift for descent. The lift is varied by changing engine speed (normal throttle control action).

Both types have their respective merits:

(1) Collective Pitch - tends to respond quicker to control movements and is easier to fly in windy conditions. Also when a model is landing there will be no 'bouncing' as all the lift can be removed quickly.

(2) Non-collective Pitch - this tends to be more robust during the initial training period and can be repaired easily and with less expense than Collective types. With non-collective pitch control, landings can be more difficult as rotor speed lags behind throttle control response. Non-collective pitch rotors have the advantage that they can be converted to collective pitch types with the 'Expert' Head and Fittings Kits.

Helicopters are expensive - so go about them the right way. Start by reading the instructions together with the plan and studying the parts. Do at least one 'dry run' before finally starting work. When you do start building, follow the drawings and instructions. The manufacturer spends a lot of time and money designing the model - and he knows the answers. After you have been flying for a while you will understand that a 'minor change' can make a good helicopter into an 'unmanageable monster'.

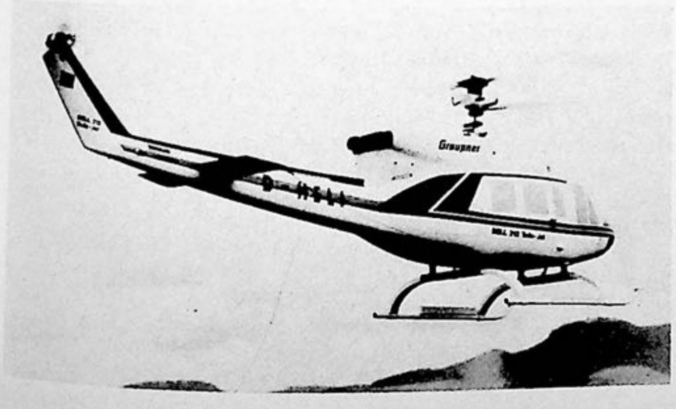
Take great care in balancing the rotor blades and don't forget to balance the tail rotors as well. Mark the rotor tips with different colours (tape or dope). Always assemble the mechanics with 'Locktite' or similar compounds, because however well balanced the main rotor is, you will still get some vibration.

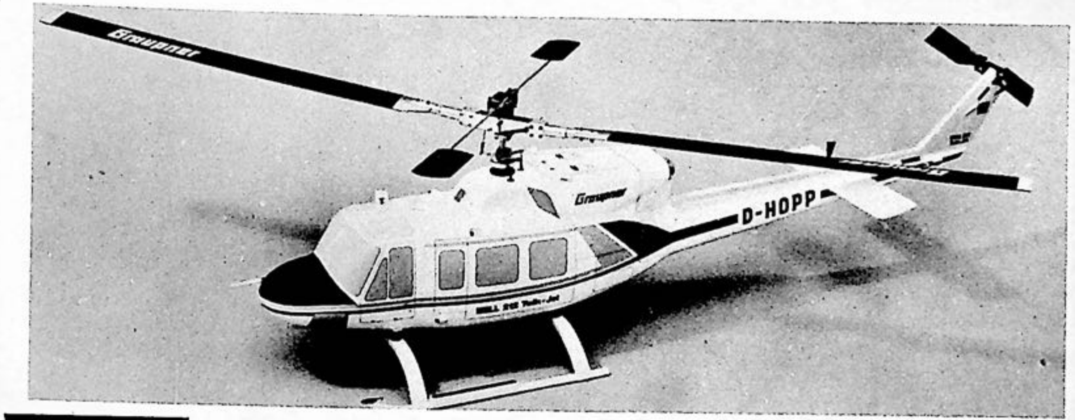
When installing the radio gear ensure there is no play in the linkages and that the controls do not bind. Either fault can make a helicopter unmanageable.

Whilst on the subject of radio installation, it is worth noting if you are already a multi-flyer, do not change your style or mode of radio control set-up (e.g. if you have used throttle left - use throttle left for throttle on non-collective and collective pitch types). On models where the fuel tank cannot be seen use a Kavan Fuel Warning Set. Do not forget to fit a fuel filter (and 2mm Silicon tubing is the best fuel pipe. It does not become hard with age). Fit an external connector for the glowplug lead.

When fuelproofing the model do not forget the inside structure - the exhaust gases seem to get everywhere when you hover close to the ground.

IMPORTANT! Before even running a helicopter, check for balance. The position shown on plan is excellent for hovering practice. But for more advanced piloting a slightly more forward position can be beneficial. Never try to fly a helicopter with a C.G. position rearward of that shown on the plan. This can be disastrous!





Graupner BELL 212...

FUNCTIONS

- Collective pitch control coupled with engine throttle.
- Cyclic pitch control about the lateral axis; forward, backward.
- Cyclic pitch control about the longitudinal axis; right, left.
- Tail rotor pitch control about the yaw axis; right, left.

SPECIFICATION

Main rotor dia	63"
Fuselage length	54"
Length o/a	76"
Tail rotor dia	11¾"
Main rotor gear ratio	9.928:1
Tail rotor gear ratio	2.5:1
Airframe weight	9½lb
Permissible payload	5½lb
Max. take-off weight	15½lb

Featuring both CYCLIC PITCH CONTROL and COLLECTIVE PITCH CONTROL for full handling capabilities - especially in hover and landing. Powered by the STAMO 61 special fan-cooled motor. Designed for flying with 4-function radio.

FUSELAGE KIT cat no B-G4600

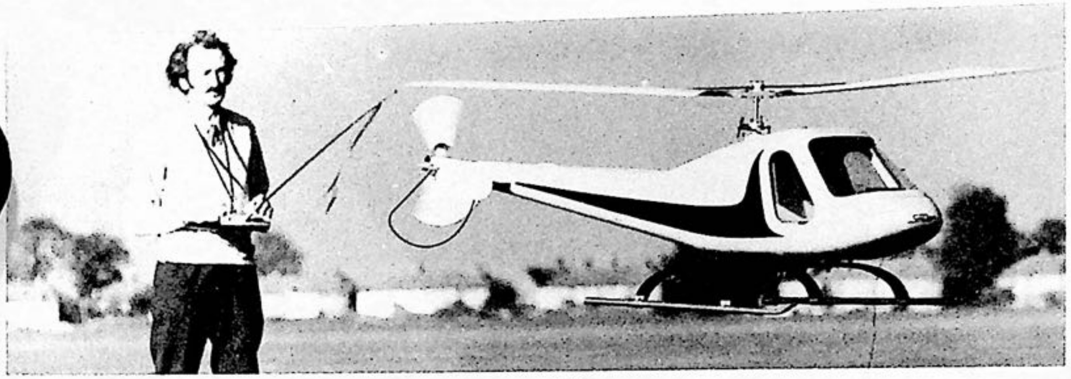
FINISHED FUSELAGE with integral fin in hi-quality GRP; printed and die-cut aircraft quality ply; pre-shaped balsa parts; milled main rotor and tail rotor blades; laminated ply landing gear struts; pre-shaped aluminium tube skids; tail rotor shaft and shaft guide tube; adhesives, decals, illustrated building instructions.

MECHANICAL PARTS KIT cat no B-G80

HB 61 STAMO glow engine with radial type cooling fan and special muffler; flywheel; automatic centrifugal coupling and main rotor gearbox; ready-to-install tail rotor gearbox; main rotor shaft and bearing; swash plate; ready-to-install rotor head; stabilising rotor blades complete with steering rods; all misc. hardware required. Spares also available individually.

B-G90 Training Landing Gear, B-G91 Float Landing Gear, G1545 Engine only (HB61 Stamo), G1546 Engine Silencer only, B-G81 Rotor Head only, B-G82 Main Rotor Blades (pr), B-G83 Tail Rotor Blades (pr), B-G84 Steering Rotor Blades (pr), B-G85 Main Rotor Shaft only, B-G92 Extended Rotor Shaft Assembly (for initial flight training).

SCHUCO HELICOPTERS



"SCHUCO DS-22 HELICOPTER"

Easy-to-assemble, easy-to-fly R/C helicopter with cyclic pitch control (Schluter System rotor). All pilots have reported favourably on the DS-22! This model comes as a COMPLETE KIT (less engine). Moulded glassfibre fuselage, prefabricated wood parts, undercarriage parts, hardware, etc - plus a complete set of precision-manufactured mechanical parts.

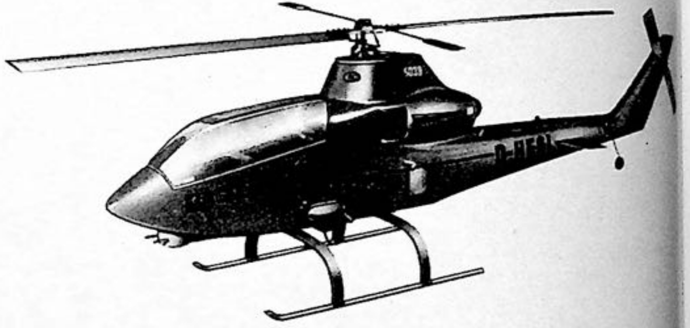
Optional extras include training landing gear and float landing gear. Power by any .60 glow engine (Austro-Webra 61 specially recommended). ADVANCED ROTOR HEAD as for 'GAZELLE' can be fitted.

SPECIFICATION

Fuselage length 57"	
Rotor diameter 61½"	
Weight: approx 11lb	
For 4-function radio	
Helicopter complete	B-U201/420
Links & cranks set	B-U203/770
Standard rotor head	B-SH751
Collective rotor head	B-SH752
" conversion pack	B-SH759
Ex wide landing skids	B-SH765
Tail rotor blades (pr)	B-SH846
Main rotor blades (pr)	B-SH847

"FLOAT KIT"

Specially recommended for training - or for taking off or landing on water. Lightweight inflatable floats with hardware cat no B-SH766



"SCHUCO BELL HUEY COBRA"

Designed by Dieter Schluter and featuring the proven 'Schluter System' main rotor head with stabiliser bar and steering blades. Full flight control is provided by 4-function radio - engine speed (controlling rotor rpm), cyclic pitch (2 functions) and tail rotor pitch. The large fuselage provides good 'damping' in yaw. Flight stability and control characteristics are outstanding - making this an ideal model for training. Length 72½" Rotor diameter 63" Weight approx 11 lb. Matching engine size .61.

This de luxe kit is available in two parts. FUSELAGE AND WOOD AND HARDWARE KIT, including moulded glass fuselage and prefabricated wood parts, etc, to complete the airframe. MECHANICAL PARTS KIT includes a complete set of ultra-precision manufactured mechanical components, prefabricated for easy assembly. Easily followed building and flying instructions, extensively illustrated with photographs.

For more advanced flying, the BELL HUEY COBRA can be converted to COLLECTIVE PITCH CONTROL by replacing the standard rotor head with the Schluter 'ADVANCED' head (see under Schluter GAZELLE).

Helicopter Mechanics Kit B-U201/400, Fuselage & Hardware (2 boxes) B-U201/410, Standard Rotor Head B-U203/750, Main Rotor Blades (pr) B-U203/821, Tail Rotor Blades B-U203/824, Collective Rotor Head only B-SH752, Collective Conversion Pack B-SH760, Extra Wide Landing Skids B-SH765, Floats Landing Gear B-SH766.

AX

RA"

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FUSELAGE AND
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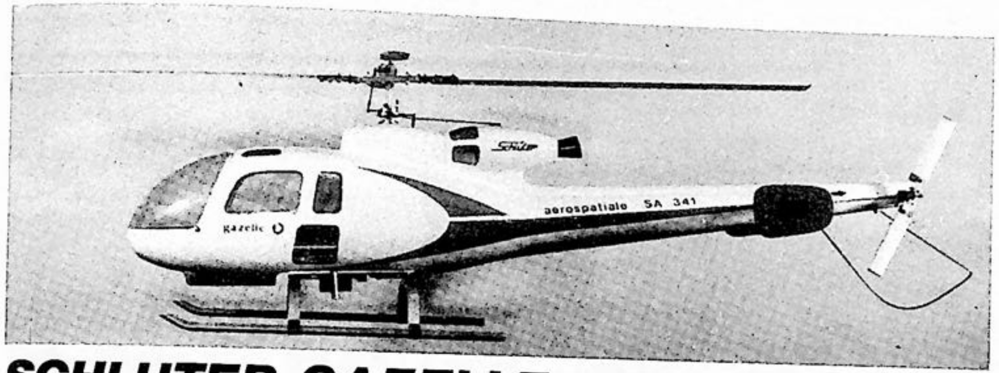
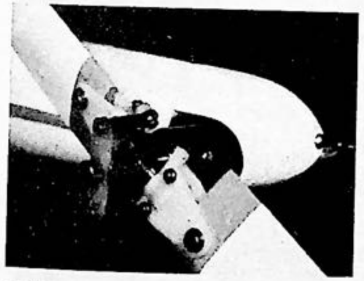
RIPMAX



SCHLUTER GAZELLE

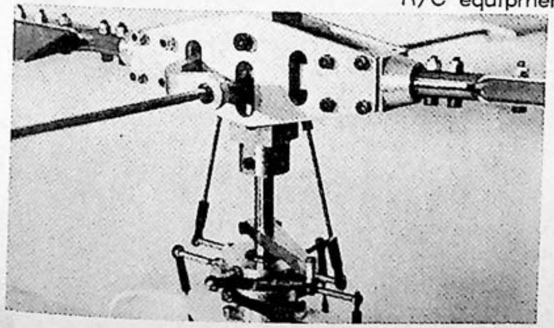
Fuselage length 57"
Rotor diameter 62"
Weight: approx 10lb
A 1/5th scale model



The GRP fuselage is true monocoque, needing no formers. Preformed baseplate guarantees exact installation of drive unit. Other prefabricated parts designed for quick - easy - and accurate - assembly of all systems.

Choice of 'Schluter System' main rotor with cyclic pitch, or Schluter's new COLLECTIVE PITCH main rotor head (recommended for more experienced pilots). This COLLECTIVE PITCH ROTOR HEAD can also be used on the BELL HUEY COBRA and DS-22.

The elegant, fully streamlined fuselage has very low drag, making the 'GAZELLE' less susceptible to the effect of cross- and head-winds than most other R/C copters - and results in a maximum forward speed in excess of 70 mph. Power by any 61 motor. R/C equipment 4 to 8 channels.



Helicopter complete	B-SH703
Fuselage Kit only	B-SH702
Standard Rotor Head	B-SH751
Collective Rotor Head	B-SH752
Extra Wide Landing Gear	B-SH765
Floats Landing Gear	B-SH766
Tail Rotor Blades (pr)	B-SH846
Main Rotor Blades (pr)	B-SH847
Helicopter Silencer (fits Austro-Webra 61)	B-SH928

PILOTING TIPS...

Obtain help from a competent pilot - your local shop should be able to help. A helicopter which has been trimmed out is decidedly easier to learn with. Practice landing gear, use (i) floats for 3-4 hours. (ii) DS22 type practice gear with ally skid supports of approx. 22" - 24" width. (iii) As you become more proficient gradually reduce width of landing gear to scale width which requires precise landing each time. Engine settings - always set engine on the rich side as it will then accelerate slowly instead of cutting. Main rotor blades have been set according to manufacturers instructions. They now have to be reset under working conditions, so that the model begins to lift at approx. half throttle. Next, set tail rotor pitch so that model maintains constant heading and does not tend to spin around its own axis. Centralise trims on Tx and return model for above conditions. After first runs check out ALL nuts, bolts and installations for tightness and correct operation. Always hover the model in such a position that you can watch the side view to prevent excess pitching - and have correct orientation at all times. It is good practice to thoroughly clean your model after each flying session. From now on it is just a matter of practice!

MODEL BOATS

by Len Hooley (regular contributor of "Matters Marine" to Radio Modeller)

Sooner or later you will decide to have a crack at making a boat for a change. Model Boats fall mainly into four categories, 'Flatties' or the racing type of boat, SEMI-SCALE cabin cruiser types, SCALE TYPES of Warships, Tugs, Cargo Ships, etc., and SAILING SHIPS which include Yachts, Schooners, Catamarans, etc. Propulsion can be of any origin - Sail, Diesel, Glow or Petrol Motor, Steam, or Electric - and even rubber band motors!

Methods of construction vary from the old-fashioned Bread & Butter construction, carving out of solid, Hard Chine, Formers and Planks, a variety of plastics through to fibreglass. Quite some successful models have been made from laminated gumstrip. Whichever system you decide to use is entirely up to you but whatever it is, I am sure that you will enjoy it.

One of the basic things to think of before finalising on a design is 'Access'. Be sure that after the model is finished that you are able to get in and remove things easily. There is nothing worse than after knocking off a rudder to find that you are unable to get in and replace it. Props, shafts, engines and couplings etc. of which there are many, are only as good as the installation you make. The finest ballrace shaft or engine is useless unless you get everything in line. If your engine or coupling is out of line, this will create friction which causes overheating and of course loss of power.

Before installing the shaft and tube, think of a few points. Have you left enough clearance to fit a larger prop if the occasion arises? Have you left enough room for the rudder? If you have decided on a long shaft, will there be enough room to get the fuel tank in the correct position? All these points can save a lot of trouble later on.

In fitting the shaft make a rough check where it is going to lay then put a couple of spots of Bondapaste to tack it temporarily until you have found its final resting place. Check your alignment by fitting it all up, removing the Glowplug or releasing the compression. Then while looking at the coupling, rotate the engine by the propeller, making the necessary alterations until the coupling runs true. You will find that Bondapaste sets very rapidly and if only a couple of spots are used they can easily be broken away and re-set correctly. Finally when all is in line, seal in the tube with fibreglass resin and glass tape leaving no unprotected lengths to wobble and cause vibration. Diesel and glo engines are better mounted on a removable metal base plate so that if the motor has to be removed at any time for replacement parts or couplings, it can be replaced without altering the alignment. There is also the SHG Fibreglass Mounting base which can be resin-bonded into the hull. This has wood bearers built into the glass mount then the engine is mounted with self tapping screws or with blind nuts and bolts.

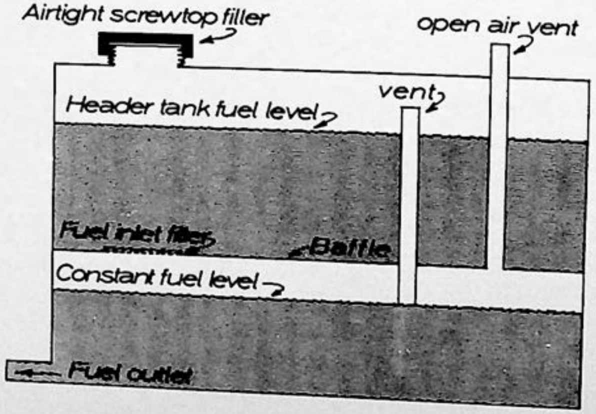
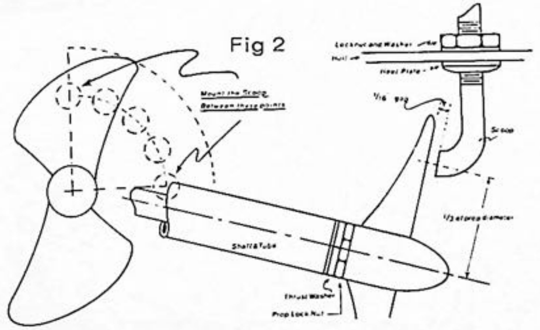


FIG. 1. CHICKEN HOPPER TANK

With wooden hull boats be sure to thoroughly fuel proof the engine compartment first. Care should be exercised in mounting the fuel tank. So many newcomers make the mistake in thinking that they can put it anywhere there is a space. The highest point of the fuel in the tank must NEVER be above the needle valve. The engine will always suck up the fuel but if it is higher than the valve then it will flood and you will never start it, or it will never run through overflooding. Quite honestly if you are going to build a craft that will assume various attitudes in the water at different speeds then it is far better that you make yourself a chicken feed hopper tank. Fig. 1. This will give you a constant head of fuel at all times.

Water cooling also plays a most important part in smooth operation of the engine. Be sure that the inlet and outlet pipes do not kink or sag with the heat onto the manifold with disastrous results, or better still use silicone heat resistant tubing. There are various methods of getting the water away from the head but personally I favour the side of the hull rather than the stern. The only indication you have that the cooling is working properly (apart from the engine seizing up through overheating) is a visible sign of a jet of water from the outlet. If this happens to be at the stern then it is difficult to see with the wash of the prop churning everything up. From the side you should see quite clearly at least a six inch jet of water leaving the outlet pipe. If not throttle down and return, there may be weed in the scoop or it may not have been correctly installed.

The correct waterscoop installation is as follows. The centre of the aperture of the scoop must coincide with a circle which is concentric and two-thirds the diameter of the prop. Fig. 2. The scoop may be positioned anywhere on this circle between 12 o'clock and 3 o'clock, i.e. central to the starboard top quarter. The actual position depending on the ease of fitting and/or other equipment such as rudders, steering gear, etc.



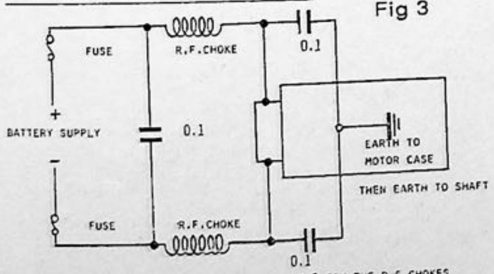
The scoop should be placed as close to the prop as possible, a gap of 1/16" or 3/32" being ideal. Always allow for end float in the shaft.

Electric motors require exactly the same amount of care in alignment and should spin quite freely. The only problem that you are likely to encounter is electrical interference on the radio. All motors should be suppressed (Fig. 3) and adequate fuses should always be inserted well within the maximum rating of the motor.

Deck trim can be executed in a variety of ways all depending on the type of craft. One can inlay shapes of polished lino into the wood, or various coloured woods. Use a ruling pen to draw planks and then varnish or as I often do cut separate planks and lay them down like a proper deck using a thick grey finishing line for the joints.

NOISE SUPPRESSION SYSTEM FOR ELECTRIC MOTORS

Fig 3



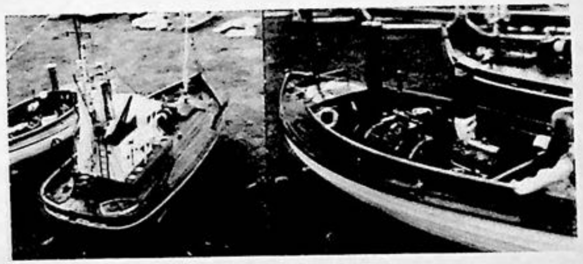
KEEP ALL BATTERY LEADS AS SHORT AS POSSIBLE & FIX THE R.F.CHOKES (TV SUPPRESSOR CHOKES) & CONDENSERS AS NEAR TO MOTOR BRUSHES AS POSSIBLE. KEEP AERIAL LEAD AND RECEIVER AS FAR AWAY FROM MOTOR AS POSSIBLE.

Now a note regarding fittings. If some of these will be fitted in a vulnerable position it may be a good idea to drill them out & insert a small piece of dowel which can be inserted into the deck and fixed with Devcon. On certain scale models you will, of course, have to make up your own fittings. This is not as difficult as it may sound because the master can be fashioned from wood, sealed with sanding sealer a couple of times until a glass-like finish is obtained, then a mould made from a variety of substances to cast the fittings in one of the many Devcon two part epoxy fillers - aluminium, steel or copper. I usually use Devcon Flexanne for my moulds as no release agent is required and one can remove the fitting after it has set without damaging the mould.

When it comes to building the cabin top don't forget that engines like to breathe in order to keep running, so allow plenty of ventilation for fresh air to reach the intake and exhaust gases to escape. Carry the cabin windows to within 1/8" of the top of the frame all round. If on your first run you find that the torque of the engine causes the craft to veer to the right all the time, this can be counteracted quite easily by making a small tapered wedge and fixing it to the hull stern on the right hand side. Make one of balsa wood first and chop it to suit by trial and error. When you finally decide it is correct, make a proper one from hard-wood, fix it on and paint in the usual way.

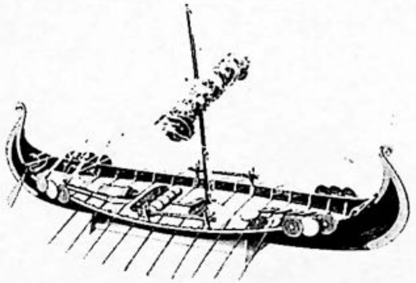
With regard to painting your model, remember that the finish will only ever be as good as the surface underneath, therefore a little care and patience will be well rewarded. A good primer such as Bondaprimer will take on anything as it etches its way in and can be rubbed down with wet and dry paper to get a mirror like finish on which you can put your undercoat - and finally a top coat of any of the Polyurethane paints that are on the market. Try the finish first to make sure that it is fuelproof against the fuel you are using. If not, give it a coat of Tufkote.

Your model can be fitted out to look as realistic as any full size craft - sailing boat or power vessel.



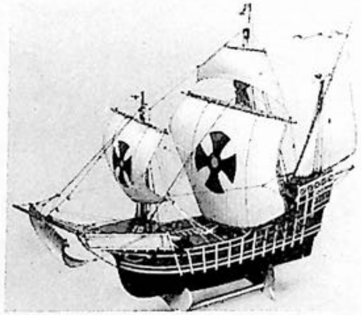
GRAUPNER
BOAT KITS

RIPMAX



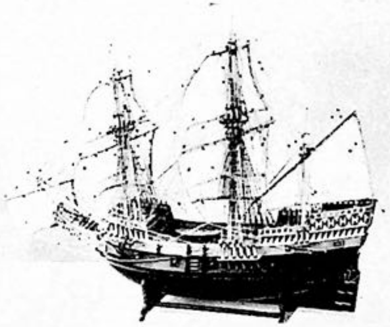
VIKING SHIP cat no C-G2099

1/48th actual size. Length 17¾" (450mm). Beam 4" (106mm). A detailed reconstruction of a 9th century Viking ship. The kit contains printed plywood, dowels, rigging yarn, sail linen, finished net, cement, etc. Fully detailed plan with assembly instructions. Fittings Set C-G435.



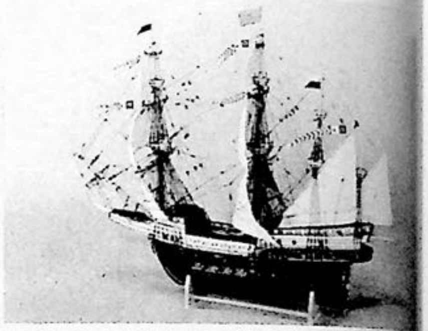
SANTA MARIA cat no C-G2093

A finely detailed model of the flagship of Christopher Columbus, 1/64th actual size. Model length 24¼" (615mm). Beam 4¾" (121mm). Carefully prepared kit contains printed balsa and ply panels, stripwood, dowels, rigging yarn, etc. Fittings Set cat no C-G427.



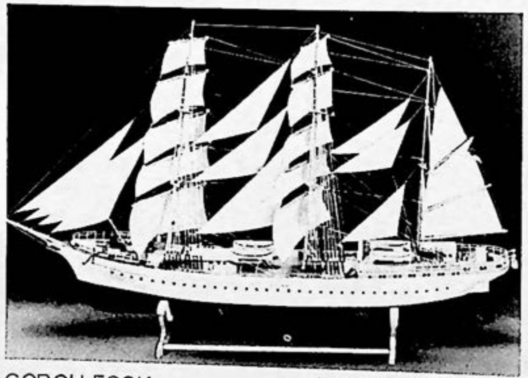
MAYFLOWER cat no C-G2119

1/64th scale model of a 16th century merchantman. Length 23½" (600mm) Beam 4¾" (121mm). Kit includes hull ready milled to shape, die-cut and printed ply, dowels, rigging yarn, printed sailcloth, cement, decals, etc. Twin-coloured rigging plan. Fittings Set cat no C-G472.



ADLER VON LUBECK cat no C-G211

Profusely detailed period scale model. 1/90th actual size. Length 34" (870mm). Beam 6¾" (170mm). Kit contains building plan, printed balsa and plywood panels, strips, dowels, cement, sails, rigging yarn, etc. A superb exhibition model. Fittings Set cat no C-G463.

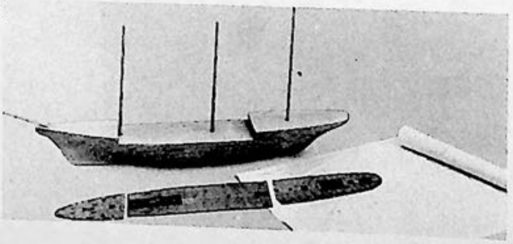


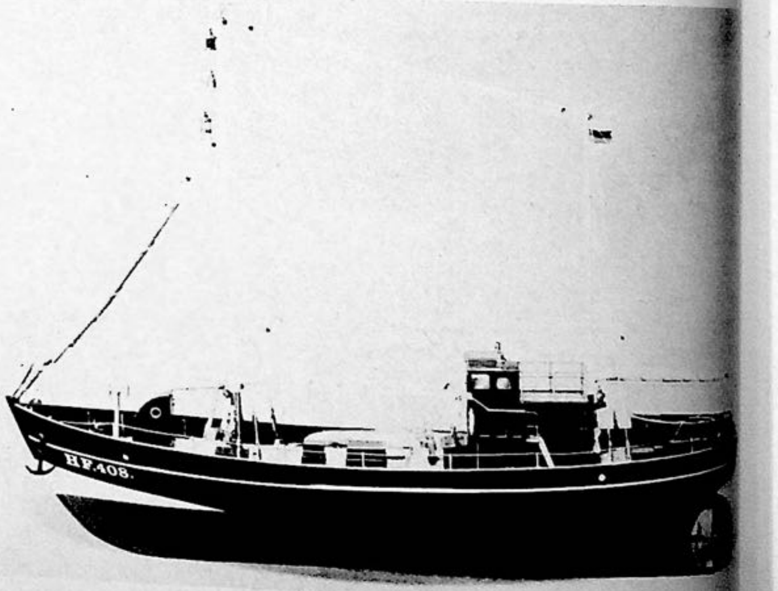
GORCH FOCK cat no C-G2113

Training sail ship of the German Navy. This is an authentic 1/150th scale model. Length 23½" (595mm). Beam 3¼" (80mm). Hull already milled to shape in balsa. Die-cut and printed balsa and ply, sailcloth, etc. Fittings Set cat no C-G470.

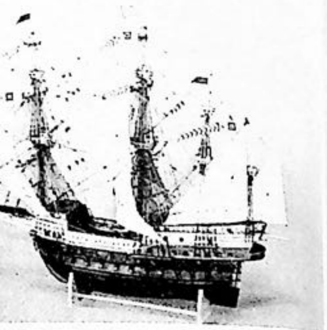
ELKE cat no C-G2127

Superbly scaled fishing cutter, 1/36th actual size. Length 26¼" (666mm). A working model for electric motor drive and R/C installation. Finished moulded ABS plastic hull. All other parts necessary to complete basic model ready for painting, including sails, spars, etc. Specially designed for quick and easy assembly. Quickbuild plan and R/C installation details. Fittings Set cat no C-G478.





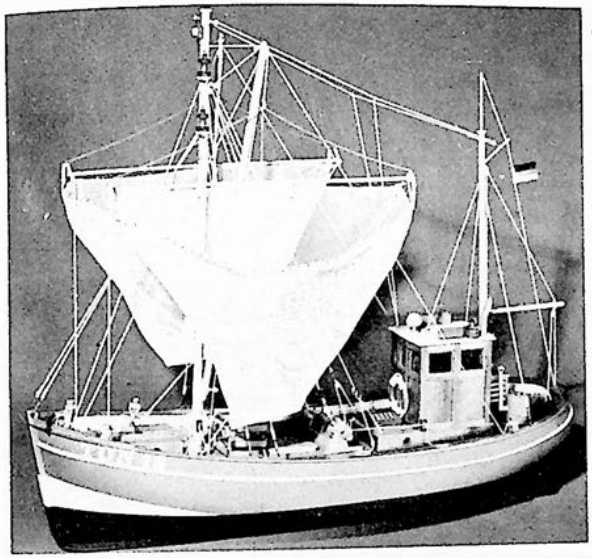
IPMAX



VON LUBECK cat no C-G2111
y detailed period scale model.
ctual size. Length 34"
). Beam 6¾" (170mm). Kit
building plan, printed balsa
ood panels, strips, dowels,
sails, rigging yarn, etc.
exhibition model.
Set cat no C-G463.

RIPMAX

GRAUPNER BOAT KITS

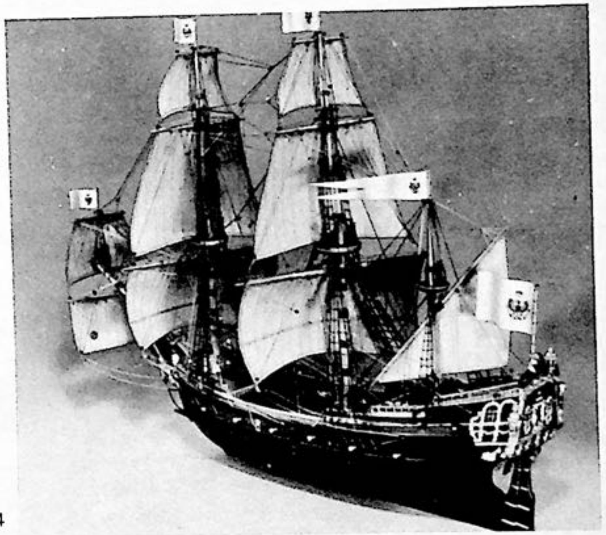


FRIGATE BERLIN cat no C-G2131

Highly detailed reconstruction of a Prussian frigate of 1674 A.D. Scale 1/50th. Length 26" (670mm). Beam 5" (131mm). A fabulous exhibition model. The kit contains balsa hull milled to finished form, die cut and printed ply, dowels, rigging yarn, printed sailcloth, cement and materials for a cradle. Quickbuild plans and tri-coloured rigging plan. Fittings set includes fully-detailed 'gold-plated' decorative parts. Cat no C-G486.

cat no C-G2141 CRAB CUTTER

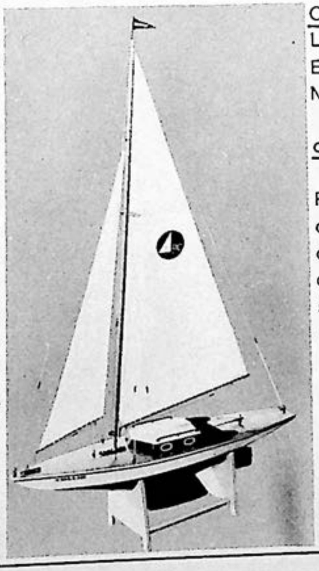
A fascinating - and authentic - model of a small sea fishing vessel, 1/25th actual size (19" long). You can build it as a working model with electric motor power (and radio control!) - or as a static exhibition model, fit to grace any den! Easy-to-build kit includes finished moulded plastic hull and many other prefabricated parts, dowels, rigging, nets, etc. etc. Fittings set cat no C-G434



"GRAUPNER YACHTS"

Graupner yachts have hull forms developed by experienced model marine architects, ensuring superb sailing performance. In addition the hulls are READY FINISHED in tough, smooth plastic. Saves hours of building time - and ensures a true hull form.

Both models have also been designed specifically with radio control in mind. A separate overlay plan is included, showing radio installation details. The smaller COLLIE is specially recommended as a beginner's model. The OPTIMIST is a scale one-tonner, with all the superb handling qualities that will delight the more experienced skipper.



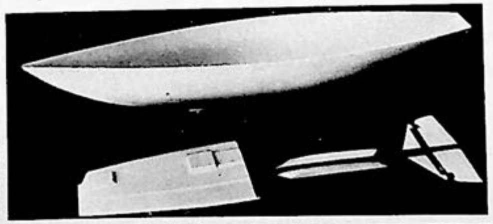
COLLIE
Length 28" (710mm)
Beam 6½" (166mm)
Mast 33½" (851mm)

Round bilge sailing yacht. Kit includes extruded hi-impact plastic hull and is designed for easy assembly. Kit includes all parts (except fittings).

fittings set C-G473

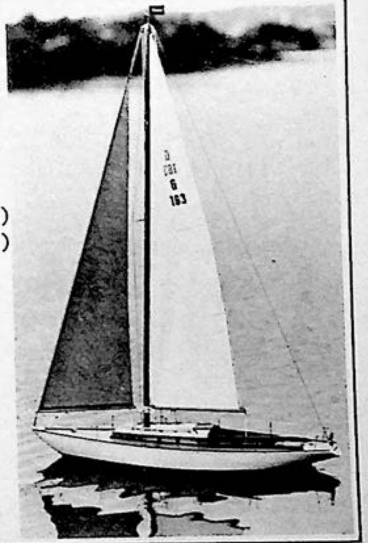
cat no C-G2125

Ready-formed hull, keel, rudder and cabin roof in hi-impact plastic. Die-cut balsa and ply parts, stripwood, dowels, sailcloth, etc. An ideal subject for radio control.

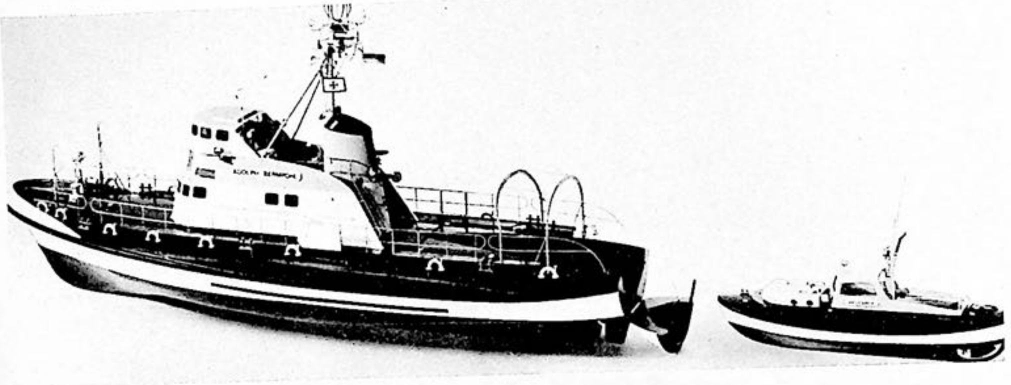


OPTIMIST
Length 41" (1040mm)
Beam 10½" (270 mm)
1/11th scale model

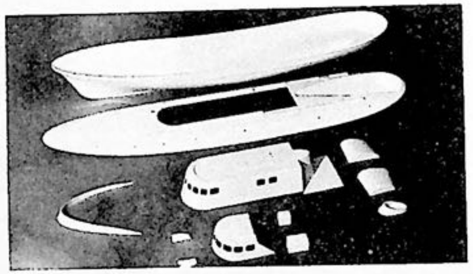
cat no
C-G2133
keel
C-G485
fittings
C-G484

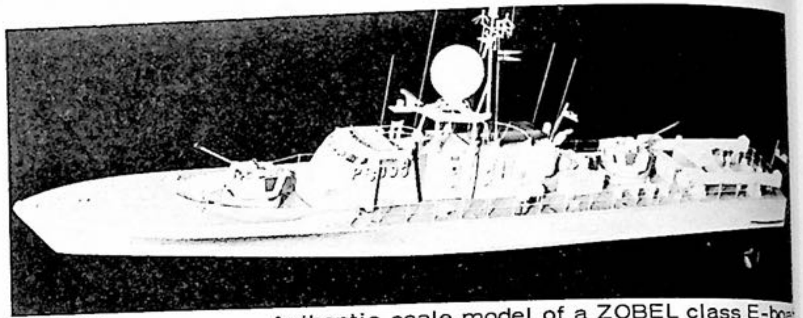


GRAUPNER BOAT KITS



ADOLPH BERMPOHL 48" long cat no C-G2137 1/22nd scale rescue ship powered by 3 electric motors. VEGESACK, 16" long, is electric powered daughter ship which can be launched, separately manoeuvred, and recovered by radio control. Kit includes hull, deck and other finished parts in moulded plastic, plus wood parts, etc. Fittings cat no C-G489, R/C Kit cat no C-G406, Stern Door Access C-G407, Vegesack C-G488.





WEISEL
Length 42" (1070mm)
cat no C-G2145
fittings set C-G442

Authentic scale model of a ZOBEL class E-boat powered by three electric motors - speed approx. 2.7 knots. High developed hull design gives superb manoeuverability and seaworthiness. Kit includes ready-formed hull with transom, bridge, deck superstructure, etc. in ABS plastic. Plus printed and die-cut balsa and ply, dowels, window glazing, tubes, flags, adhesive, etc.

COMMODORE
Length 28¼" (717mm)
Beam 9½" (240mm)
cat no C-G2123

Ready-formed hull in tough ABS plastic, die-cut balsa and ply parts; plastic seat mouldings, etc; stripwood; rudder and all fittings included. Designed for quick and easy assembly. The hull shape is specially developed for good handling performance and speed, powered by twin electric motors. Quickbuild plan and separate overlay R/C installation plan.

NAUTIC cat no C-G2121
Length 22" (555 mm). Beam 7½" (188 mm). Kit includes ready formed plastic hull, die-cut balsa and ply parts, stripwood, shaft, tube, propeller, shaft coupling, rudder and all fittings and other hardware. Quickbuild plan with radio installation details.

KITTY Mark II cat no C-G2135
20" (510mm) long, for electric power. ABS plastic hull, seat, console, etc., die-cut ply, stern tube and prop, cement, decals, etc. A quickie kit.

"MODERN DESIGNS" Completion of the Graupner models on this page is greatly simplified by the use of modern constructional elements - i.e. moulded ABS plastic hulls and other parts.

BUGS

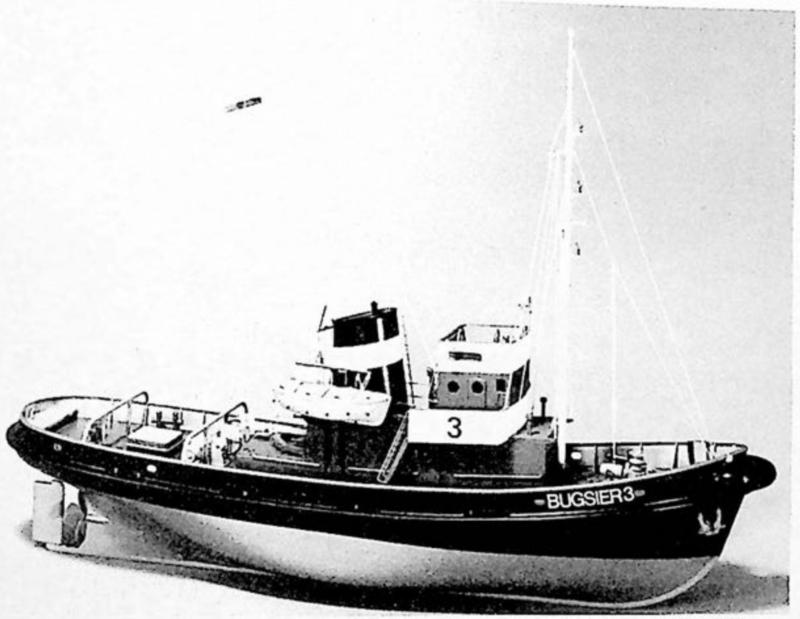
A tug is always
Graupner's BUGS
detailed model of
bulwark takes all
lifeboats, funnel
wood parts, etc. -
instructions (incl

Model is 32" (81
(203mm). 1/33 a
(4.3 kg). Maxim
6 lb (2.70 kg).
motor power. (N

De Luxe Fittings S

RIPMAX

GRAUPNER BOAT KITS



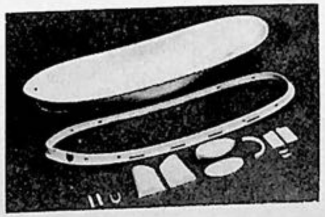
BUGSIER 3

Cat.no C-G2147

A tug is always an attractive subject for the scale enthusiast - and Graupner's BUGSIER 3 makes up into the most accurately and precisely detailed model of its type yet ! One piece hull moulding and moulded bulwark takes all the hard work out of building the hull. Kit also includes lifeboats, funnel and other plastic mouldings - plus shaped and printed wood parts, etc. - and Graupner's fabulously detailed plans and assembly instructions (including separate overlay plan showing R/C installation).

Model is 32" (810mm) long. Beam 8" (203mm). 1/33 actual size. Weight 9½lb (4.3 kg). Maximum load (for R/C gear) 6 lb (2.70 kg). Designed for electric motor power. (MONOPERM PILE).

De Luxe Fittings Set cat no C-G348



ACCESSORIES FOR GRAUPNER BOAT KITS

CAT NO MODEL	MOTOR	COUPLING	RUDDER	BATTERY	SHAFT & TUBE	PROP	R/C FUNCTIONS
G-G2121 Nautic	Monoperm Super Special M-EM141	included	Included	6 volt O-G3690	Included	Included	single 1 or 2 channels propo
C-G2123 Commodore	2 x Monoperm Super Special M-EM141	2 x K-G475/4	Included	6 volt O-G3674 or O-KM64	2 x I-G412 Bearing block 2 x I-G357/2	1 x H-G1382/5 1 x H-G1382/5A	single 1 or 2 channels propo
C-G2127 Elke	Monoperm Special M-EM139	1 x K-G475/2	Included	6 volt O-G3690 or O-G3674 or O-KM64	I-G409 Bearing block I-G357/1	H-G1382/2	single 1 or 2 channels propo
C-G2135 Kitty II	Monoperm Special M-EM139	1 x K-G475/2	I-G429	6 volt O-G3690	Included	Included	single 1 or 2 channels propo
C-G2137 Adolph Bermpohl	1 x Decaperm Special M-EM145G or 1 x M-EM805 and 2 x Mono S. Special M-EM141	3 x K-G475/4	1 x I-G433 and 2 x I-G420	6 volt O-G3674 or O-KM64	1 x I-G411 and 2 x I-G412	1 x H-G1382/10 and 1 xH-G1382/0 and 1 x H-G1382/0A	4-6 channels propo
C-G488 Vegesack	Microperm Special 1 x M-EM130	1 xK-G475/2	included	2 volt O-D2/500P	1 x I-G409	1 x H-G1382/9	2 channels propo
C-G2141 Crab Cutter	Monoperm Special 1 x M-EM139	1 x K-G475/2	Included	6 volt 1 or 2 O-G3690	I-G413	H-G1382/2	single 1 or 2 channels propo
C-G2145 Wiesel	3 x Jumbo M-G1739	3 x K-G475/4	3 x I-G420	6 volt 1 or 2 O-KM64	3 x I-G411 3 x I-G357/2	1 x H-G1382/11A 2 x H-G1382/11	2 - 3 channels propo
C-G2147 Bugsier 3	Monoperm Super Special Pile M-EM141P	1 x K-G475/4	Included	6 volt 1 or 2 O-G3674 or O-KM64	1 x I-G411	1 x H-G1382/10	2 - 3 channels propo

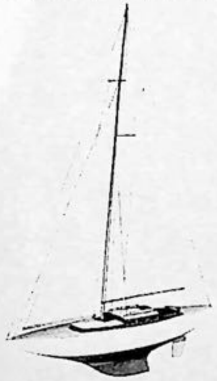
The above accessory items are those specifically recommended by GRAUPNER to match their boat kits. This does not, of course, exclude the use of alternatives - e.g. different motors, different batteries, different propeller(s). Also there will be scope for using additional accessories, especially ship fittings to your personal choice.

Recommendations under RADIO CONTROL show only the coverage required. Alternative radio controls which can be used are MACGREGOR, FUTABA and GRUNDIG.

SCHUCO BOAT KITS

MISTRAL 42" long, plastic hull and other prefab parts, sails, etc. Cat no C-U205/345.

MONSUN 30¾" long, another fine yacht for free sailing or R/C. Cat no C-U205/343.



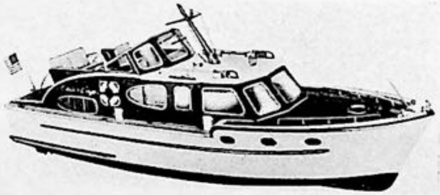
INGA IV cat no C-U205/346

A magnificent 43¼" long motor-sailer - specially designed for R/C ! Kit includes FIBREGLASS HULL and complete set of sails and tackle. Undoubtedly the best model in the Schuco range.

Fittings Set cat no C-U206/530.

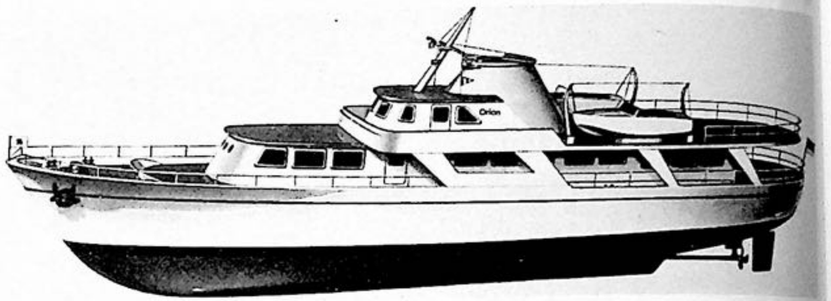
OCEANIC cat no C-U205/413

Scale ocean-going tug, 40¼" long, 7¼" beam. Recommended power is twin Monoperm Special Super Motors. An ideal subject for R/C. Fittings cat no C-U206/527.



POLIZEIBOOT 24¼" long C-U205/412

Kit contains finished moulded plastic hull and all other basic parts and materials. Fittings Set C-U206/520.



ORION cat no C-U205/372

38½" long de luxe motor yacht - for electric motor power and radio control. Beam 8". A very seaworthy design.

Fittings Set cat no C-U206/528

FAIRPLAY V TUG - C-U205/410

Length 29½". Beam 9¼". Scale realism and a real 'character' model, for electric power and R/C. Kit includes finished hull. Fittings Set cat no C-U206/523

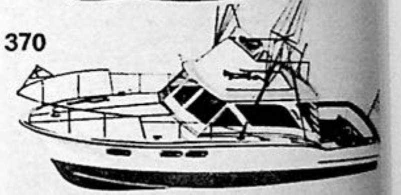
CATALINA cat no C-U205/371

35½" long motor yacht, 6" beam. Recommended power twin Monoperm Super motors. Dual power unit cat no C-U206/540. Fittings C-U206/522.

365

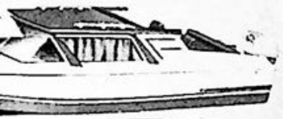
368

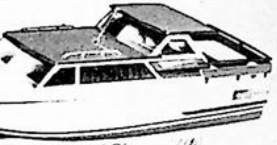
370

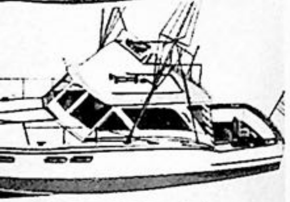


420

18¾" BATAVIA dayboat
Cat no C-U205/365
22½" BAHIA motor yacht
Cat no C-U205/368
25½" SAMARA fishing cruiser
Cat no C-U205/370
21" STELLA fishing cutter
Cat no C-U205/420

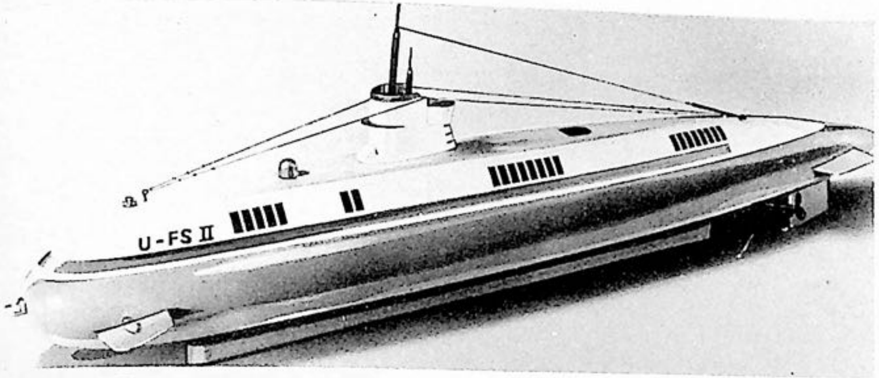






TAVIA dayboat
t no C-U205/365
HIA motor yacht
t no C-U205/368
MARA fishing cruiser
t no C-U205/370
ELLA fishing cutter
t no C-U205/420

SCHUCO SUBMARINE STERLING BOAT KITS



U-FS II SUB 40" long
cat no
C-U205/415

An improved version of the design that took the model boating world by storm when it was launched several years ago. A real working model submarine - twin Monoperm Special Super electric motor drive - and especially developed with radio control in mind. A superb near-scale model for the enthusiast.

R/C SUBMARINES

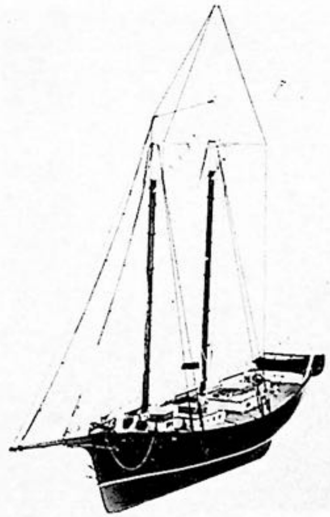
The type of radio controlled model boat that is challengingly different! And a lot more difficult - if you start from scratch! There's a lot to be learnt in designing and building a successful model submarine - so that is why we particularly recommend the SCHUCO kit. It incorporates years of 'know-how', learnt by trial and error over many years. With the limitations of the first version eliminated. In fact, you can really call it a second-generation design, as well as being a near-scale model.

Scope for 'full function' radio control - steering, motor speed, and diving trim by hydrovanes. Also provision for working searchlight on the bow.

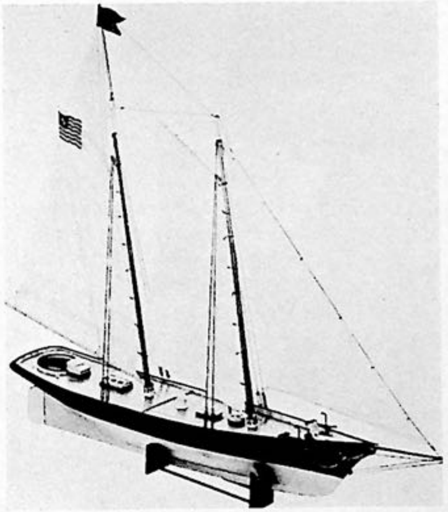
The hull design makes it easy to install radio gear, drive motors, batteries, etc - with full provision for providing watertightness. No tricky problems here, they have all been solved for you. Kit contains prefabricated and other parts necessary to complete the basic model.

And to answer the inevitable question - yes, you can still retain radio control with the sub's aerial submerged!

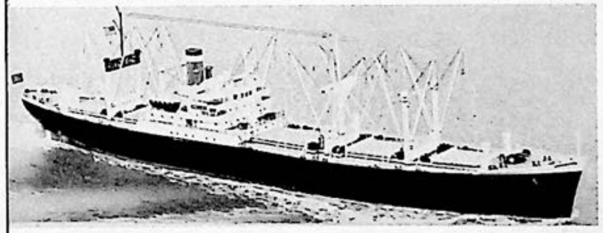
"STERLING BOAT KITS"



EMMA C. BERRY cat no C-SB21M
49½" long authentic scale model. Kit includes mast, sails, fittings, as well as hull materials, etc.



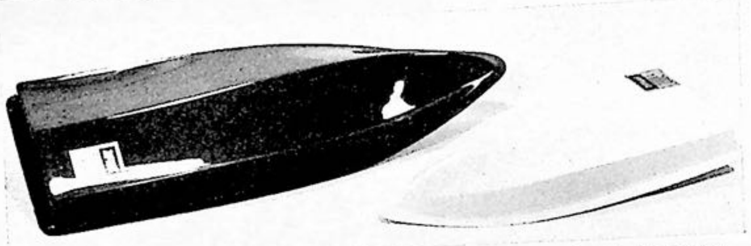
YACHT AMERICA cat no C-SB22M
For those who like old timers - this is the model! 51½" long. Build it for exhibition, or as a working model!



AMERICAN SCOUT FREIGHTER
Genuine realism in this 50" long super scale model. Ample room for radio installation - readily accessible through hatches.
cat no C-SB18M
fittings set C-SB18F

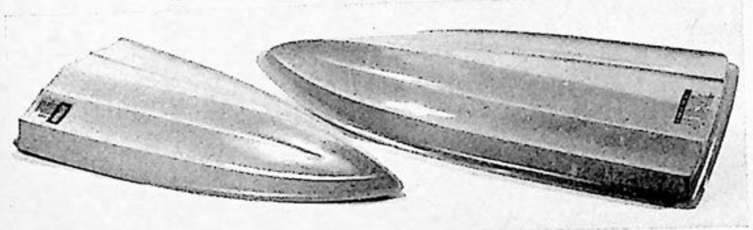
U.S.S. MISSOURI
Scale model of a famous American warship. Length 55½". Beam 6¾". Definitely a model for the warship enthusiast.
cat no C-SB17M
fittings set C-SB17F

RIPMAX-SHG GLASSFIBRE HULLS



SHALLOW VEE

Not 'flatties' but superb sport and steering hulls with medium freeboard. The SPORTSTER '20' takes electric motors or engines up to 2.5 cc. The SPORTSTER '30' is ideal for multi-boat racing. Engines up to 6 cc.



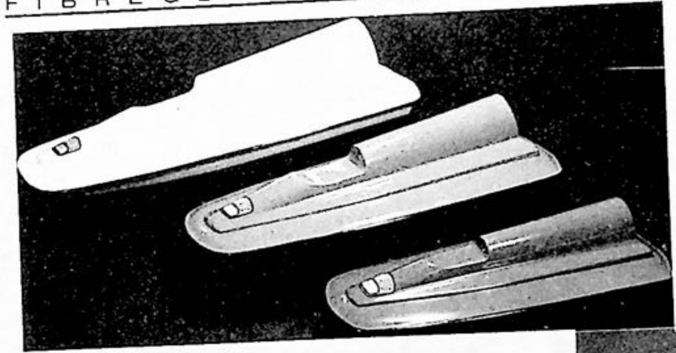
SEMI-VEE

Heavily straked undersides for 'turn-on-a-sixpence' capabilities. True 'flatties', designed for high-speed work on Naviga type courses. Engines up to 5 cc. for CONTESTER '25'; 5-10 cc. for CONTESTER '30'.

SPORTSTER 20 (20½" long) - C-SHG1
SPORTSTER 30 (28 " long) - C-SHG2
CONTESTER 25 (24½" long) - C-SHG3
CONTESTER 30 (30 " long) - C-SHG4

COLOURS:- RED, WHITE, YELLOW, BLUE, ORANGE & BLACK

FIBREGLASS CIRCUIT RACING HULLS



MERCURY '20'
cat no C-SHG11

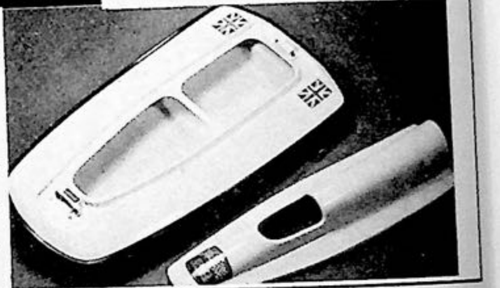
GEMINI '25'
cat no C-SHG12

APOLLO '30'
cat no C-SHG13

Colours available: White, Red, Yellow, Blue, GT Orange. Hull and deck same colour or DUOTONE option.

CIRCUIT RACERS - Fibreglass hull and matching deck mouldings - ready for installation. In three sizes.

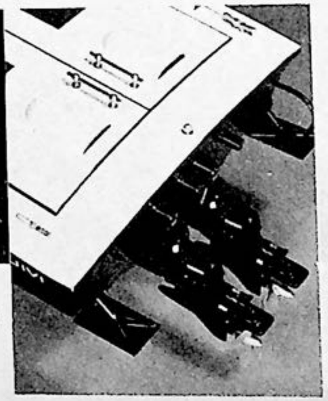
MERCURY '20' (20" long) for .15-.19 engines
GEMINI '25' (25" long) for .29-.40 engines
APOLLO '30' (30" long) for .40 engine and larger

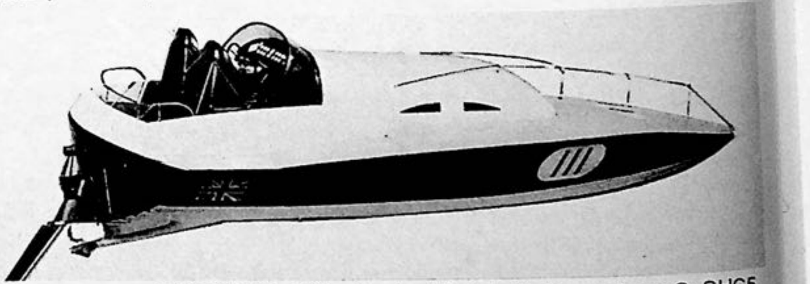


DEEP-VEE

CIGARETTE 33" Scale Model Hull - cat no C-SHG6

A faithful replica of the world's most successful offshore powerboat racer - duplicated in model size! Ideal for multi-boat, or offshore racing. Superb glassfibre mouldings, based on Don Aranow's full size plans.





DEEP-VEE

SURFURY 37" Scale Model Hull - cat no C-SHG5

Authentic 1" to the foot scale model of the Levi-designed deep-vee offshore racer with softened chine and multiple spray rails. A worthy competitor to the Cigarette - especially in model form.

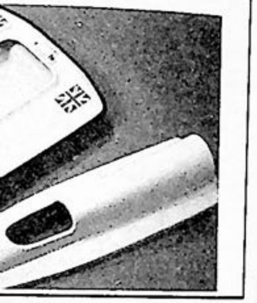
G HULLS

RCURY '20'
no C-SHG11

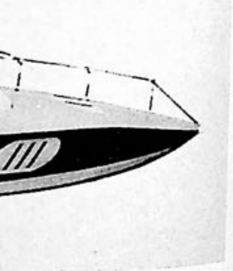
MINI '25'
no C-SHG12

OLLO '30'
no C-SHG13

available: White,
ow, Blue, GT Orange.
deck same colour
ONE option.



' long) - C-SHG3
' long) - C-SHG4
LACK



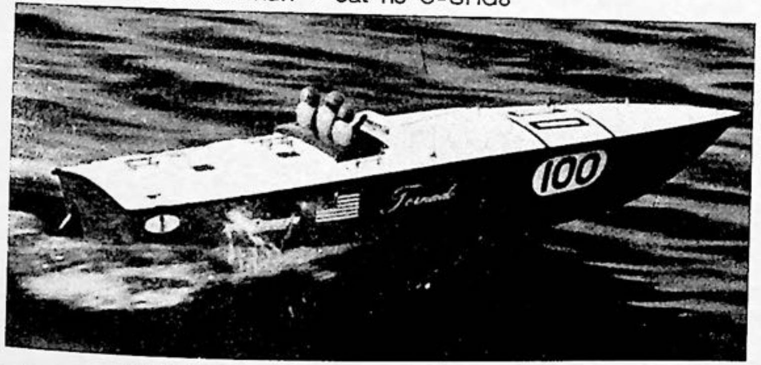
l - cat no C-SHG5
model of the Levi-
with softened chine
y competitor to the
el form.

RIPMAX-SHG BOATS & ACCESSORIES

Latest in the SHG range of true-to-scale powerboats moulded in glass fibre is the FAIREY SWORDSMAN (photograph above shows a full size Swordsman 33 in action). At present FAIREY SWORDSMAN is being manufactured as hulls only, in two sizes - 33" long by 11½" beam; and 42" long by 14½" beam. Both faithful replicas of the full size design and a suitable hull for completion either as a free-lance powerboat, or a true scale model.

Hulls are finished in white self-colour with moulded-in spray rails, gunwhale edges trimmed ready to receive decking.

33" SWORDSMAN hull - cat no C-SHG7
42" SWORDSMAN hull - cat no C-SHG8

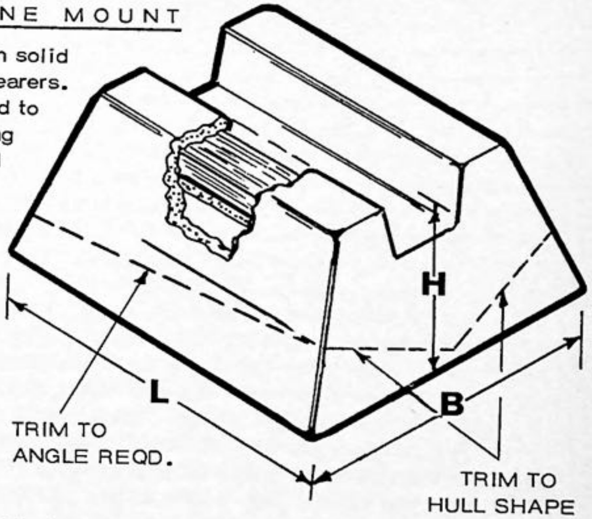


DEEP VEE

BLACK TORNADO - Faster than scale speed in model form - and still with lots of stability in hand! That proves this design - and makes it your first choice if you want to lead the field! Complete set of mouldings, decals, etc. for this 33½" long model. Cat no C-SHG21.

SHG FIBREGLASS ENGINE MOUNT

Sturdy, rigid 'hollow box' mouldings in solid fibreglass with glassed-in hardwood bearers. The bottom of the mount can be trimmed to fit any hull bottom, and cut to mounting angle required. Mount is then secured with fibreglass tape and resin. Secure engine with S/T screws or bolts and blind nuts (fitted before securing mount) - dural mounting plate screwed to top of mount.

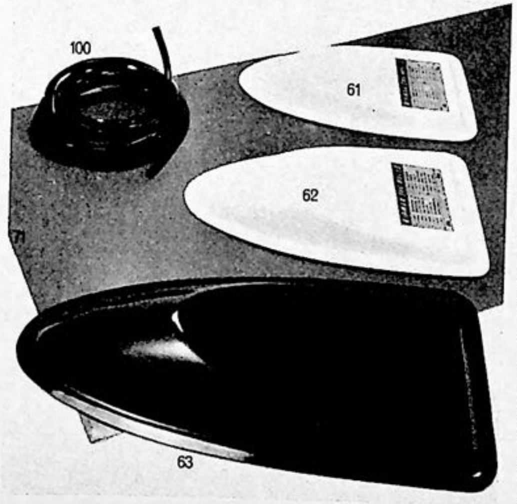


These NEW TYPE engine mounts are available in three sizes (dimensions as shown)

	L	B	H
C-SHG81 Small	5"	5"	2"
C-SHG82 Medium	5½"	5½"	2½"
C-SHG83 Large	7"	7"	3"

DURAL MOUNTING PLATES
(to match above)

C-SHG81/1 Small	size 3½" x 3½" x 1/8" thick
C-SHG82/1 Medium	size 3¾" x 3¾" x 1/8" thick
C-SHG83/1 Large	size 4½" x 4½" x 1/8" thick



RIPMAX SHG BOAT ACCESSORIES

What is more logical than a fibreglass deck to match a fibreglass hull - and where else can you get fibreglass in sheet form? SHG Fibreglass Deck Sheet replaces ply for such jobs. Finished smooth one side, and easy to cut to shape with a metal saw.

For the final touch - a range of three sizes of moulded fibreglass engine cowls. Small cowl matches up to .19 engines; Medium .19 to .40 engines; Large .40 engines and over. Plus moulded rubbing strip to bridge that deck/hull joint!

C-SHG61	Small Fibreglass Engine Cowl
C-SHG62	Medium " " "
C-SHG63	Large " " "
C-SHG71	Fibreglass Deck Sheet (34" x 14")
C-SHG100	Rubbing Strip (3 yards)

R/C BOATS

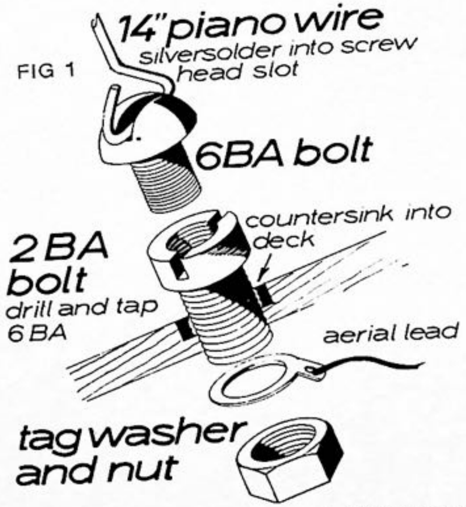
It is the ambition, if not the first aim, of every boat modeller to add Radio to his craft. Over the past few years Radio Control has become so sophisticated that one can do almost everything with it. Virtually all units are 'Superhet' these days and the outfits that come with spare crystals are obviously an advantage. If you have them you will be more inclined to use them, whereas if you have to pay a couple of pounds a set afterwards for additional crystals, it comes a bit hard.

For the benefit of newcomers to R/C, the GPO allocate a special frequency to modellers. This band is split up into six spot frequencies - Red, Yellow, Blue, Green, Orange and Brown. These are colour coded on the plug-in crystals and there are also frequency flags that clip onto your aerial to show others what band you are on. Apart from this there are what is known as split-frequencies in between the bands such as yellow/green, red/brown, etc. etc. Whether we like it or not, these are here to stay as there are so many modellers either flying, boating or car racing that there is a need for more spots, especially if another activity is taking place nearby. For those fortunate enough to own a monitor receiver there is no problem, because you can soon tell if anyone is operating on your frequency in the vicinity.

As weight is not usually much of a problem with boats, one can utilise larger receiver batteries which will give you a longer run between charges. If you have to de-rig the boat each time to gain access to the radio compartment and charge up, then you can see the advantages.

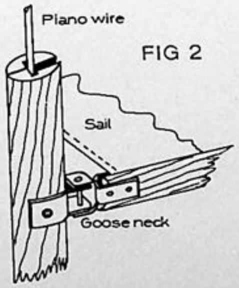
The aerial on the marine model usually consists of a piece of piano wire about 14" long with either a loop or small knob on the end to prevent poking one's eye out when bending over the model. The advantage of the piano wire aerial over the more expensive telescopic type is that it will flex when knocked against and not snap off at one of the telescopic joints. There are various methods of making these types of aerial and the more usual one is shown here in Fig. 1. If you have a yacht with a slotted mast then it is an easy matter to use the piano wire aerial by slipping in through the sail pocket and into the slot. This also prevents the sail from coming out of the slot. Fig 2. The base of the aerial can be a 2BA brass nut which can be 'Devcon' fixed into the deck and the aerial screwed into, except in the case of the yacht where the bottom of the mast can be fitted with a banana plug. This will slip into a standard radio aerial socket.

FIG 1



FLEXIBLE AERIAL FITTING (BOATS)

FIG 2



The slotted mast is made up of two pieces. The pocket of the sail fits into the slot and is secured by a length of piano wire which not only prevents the sail from slipping out but can also act as an R/C aerial.

R/C MARINE FUNCTIONS

These are confined mainly to Rudder, Throttle or Speed Control. In addition one can add things like R/C Trim Tabs, winches, working lights, etc. , Speed control these days consists of transistorised units which pulse the motor and take very little current drain from the motor battery. Before you get started on the R/C especially if you are building a Fast boat, the following points should be borne in mind.

1. Have you got a licence from the GPO?
2. Are you insured?
3. Have you got your frequency pennants?
4. Are all your batteries fully charged? This is most important.

Switch on a few minutes before you go out, then check the readings 'ON LOAD'. Don't just throw a '60' powered boat into the water along with others just because it was OK yesterday!

INSTALLATION

Too many modellers both Aircraft and Marine tend to spend a lot of time making a beautiful model then just 'throwing' the R/C gear in. A clean neat installation could save you a lot on models - even a new set of R/C gear.

YOU NEED A LICENCE!

You need a licence to operate any model radio control system - even for 'testing' a transmitter-receiver combo. A licence costs £1.50 and is valid for 5 years. No examination has to be passed - just apply for a licence form from:-

The Ministry of Posts and Telecommunications,
Waterloo Bridge House,
Waterloo Road,
LONDON S.E.1.

FAILURE to obtain a licence before using your radio control equipment can not only make you liable to prosecution, but can endanger the whole future of Radio Control modelling. So if you do not already have a licence - send for one today!

There are one or two basic points to remember. Keep your R/C gear well away from fuel or water inlets that may fracture. Don't run R/C leads next to exhaust pipes or silencers. You may think that some of these tips are frivolous but next time you see a boat pack up on the pond, find out why - and sure enough it will be for one of these reasons. Keep aerial leads well away from electric motors and keep all battery leads as short as possible to prevent interference radiation. Fit suppressors as near to the brushes as possible. Be sure that your receiver is not below the water level in case of accidents. Check that your servo movement is not restricted or the linkages binding. No backlash in the linkages either. See that your servos are firmly fixed down with the aid of rubber grommets, but not too tightly.

In some R/C yachts which are prone to water, suspend your receiver in a plastic box with four screw eyes and rubber bands to the cabin sides - Fig. 3. Check that your switch is firm and not likely to vibrate into the off position. If you are not using waterproof servos, 'HOLTS DAMP START' will help solve a few problems. Put a fuse in each battery lead for safety, if you get a 'short' it is cheaper to blow a fuse than buy a new motor. Weed round the props will stall the motor and cause excessive battery current, even a fire.

Get a friend to help you with a range check, you would be surprised if you knew how many models have been cast adrift with the aerial lead coiled up in the bottom of the boat.

Check the throttle servo to see that it opens and closes the barrel fully and is not likely to 'JAM OPEN', or the Kwik Link drop off. The fitting of a charging jack will save de-rigging the model, but be sure to cap it off to keep the water out.

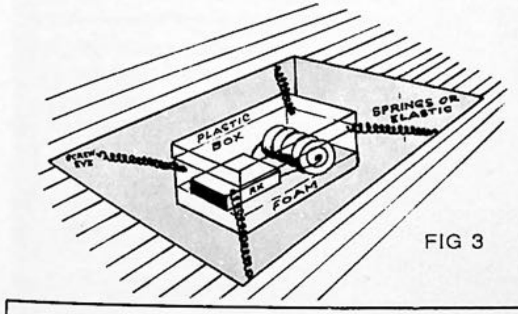


FIG 3

INSURANCE

Whatever type of model you operate - aeroplane, boat or car - you should be covered by THIRD PARTY INSURANCE. Accidents can happen - and you could be subject to costly claims.

The simplest way to get insurance cover is to join a model club. They arrange 'block' insurance for their members (and the cost may be included in the club subscription). There is also an insurance scheme operated by Model and Allied Publications, open to regular subscribers to their journals. Write to the following address for details:-

Model & Allied Publications Limited,
P.O. Box 35, Bridge Street,
Hemel Hempstead, Herts, HP1 1EE.

Sail winches for R/C yachts take on various forms and many people seem to have trouble in tangling up. I hope that the following diagram (Fig. 4) may be of help. This uses the 'Pile' gear motor vertically, at one end and a 30mm free running pulley at the opposite end with a continuous cord. This cord is passed around one pulley with two turns to prevent it from slipping and joined with a spring to keep its tension and to operate the 'cut-off' micro switches. The Shrouds are tied into the continuous bands at the required intervals.

It should be stressed that batteries used for the receiver should NOT be used for any other purpose. For operating the winch a 6 volt rechargable battery should be used. Dry batteries, although relatively cheap at the start, prove very expensive with continuous replacement. They also run down and when this occurs the receiver will stop working. A rechargeable battery will always maintain adequate operating voltage if properly charged, so that occasion should never arise.

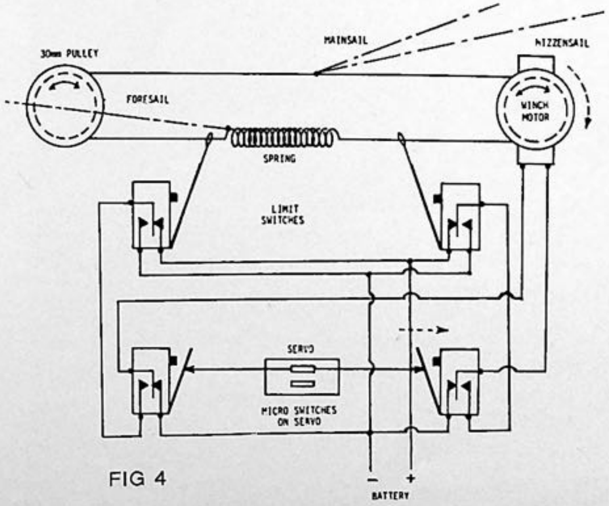
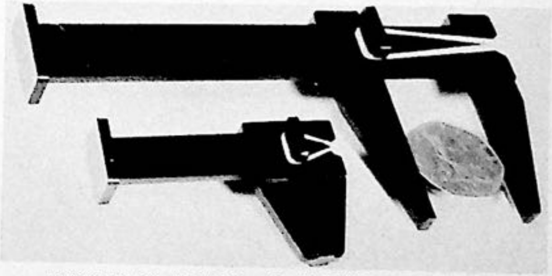


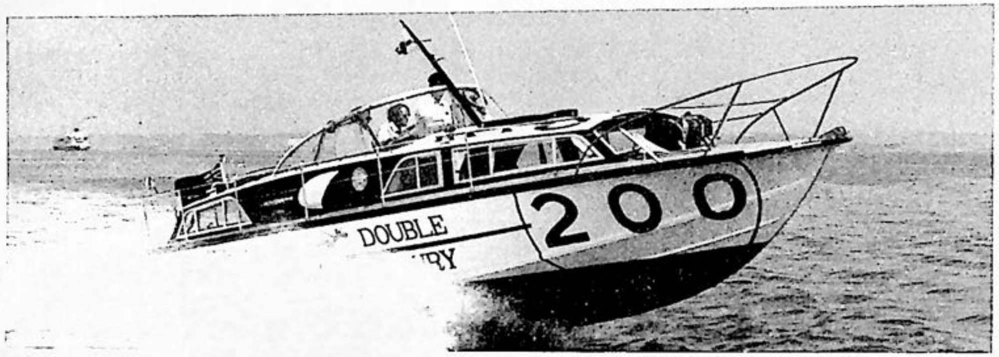
FIG 4



KAVAN CLAMPS - A CLEVER IDEA !

Every so often someone comes up with a really clever new design of tool - and here is one! All-plastic clamps with a sliding action, tensioned by a rubber band. Instantly adjustable - and you can adjust the clamping grip, too, by the size of rubber band used. The sort of accessory EVERY modeller needs.
R-K127 - Small Glueing Clamp (pkt 5)
R-K128 - Large Glueing Clamp (pkt 2)

MODEL AVIONICS

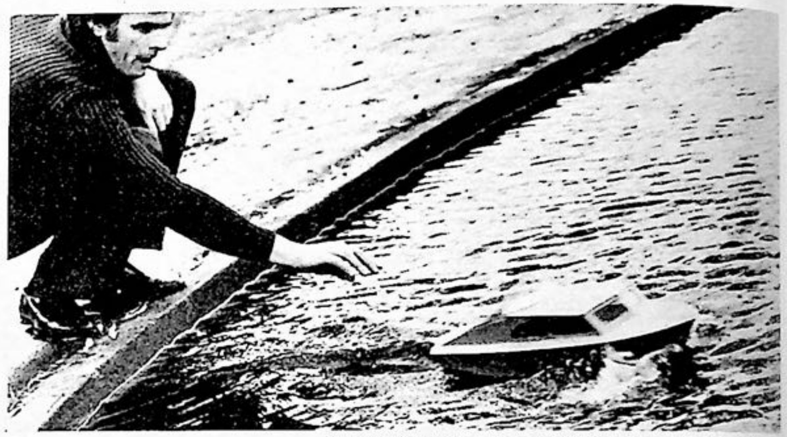


MODEL AVIONICS.....

1/8 th scale HUNTSMAN 31 - 46½"
cat no C-MAV8
1/11th scale HUNTSMAN 31 - 34"
cat no C-MAV9

Photo shows full size Huntsman 'Double Century' - prize winner in the London-Monte Carlo race.

These are "modellers'" kits, using the same materials as on the full size craft - marine ply, hardwood, etc. Accurate in shape and detail (they are scaled from works drawings), a special feature is the accuracy of shaping of all the pre-cut parts. Each kit, in fact, is virtually individually prepared.



SEA VIXEN

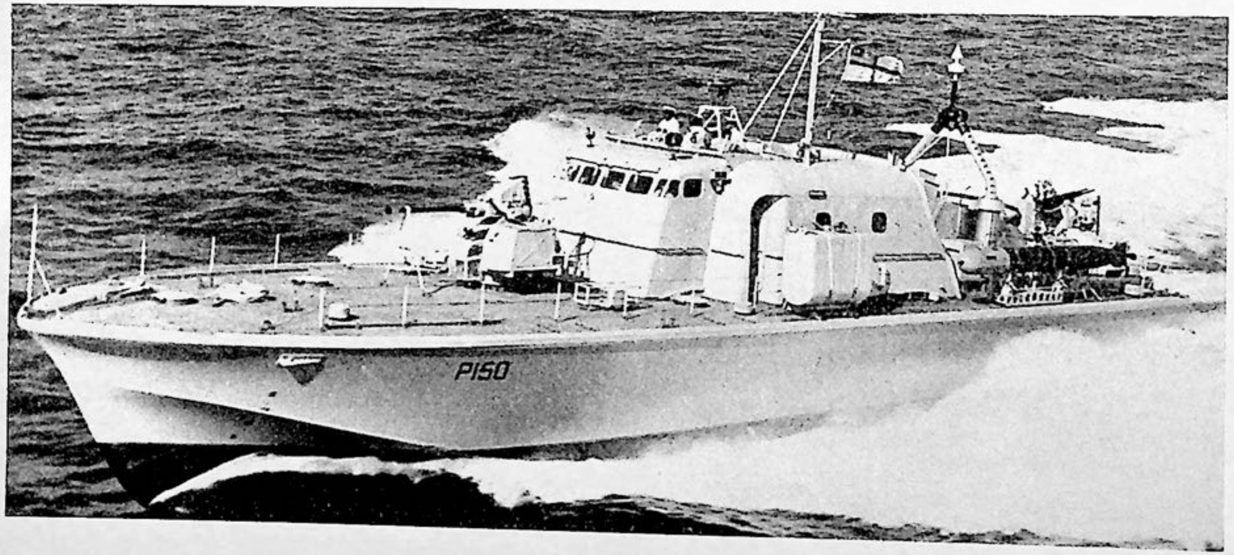
Cat no C-MAV7

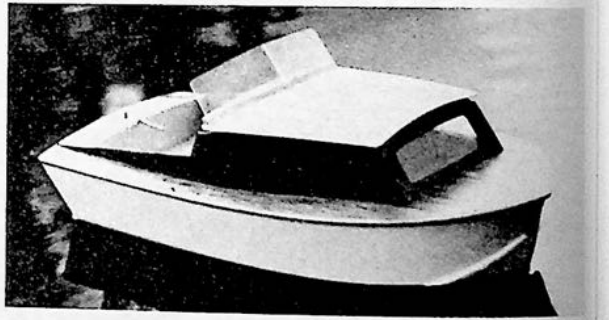
An all plywood boat of simple construction suitable for engines up to 2½cc or electric power. Suitable for either single or multi-channel radio control gear. Length 25".

SANDPIPER

Cat no C-MAV6

Length 16½". Complete with motor, rudder, prop assembly, etc. Everything you need to complete (except glue).



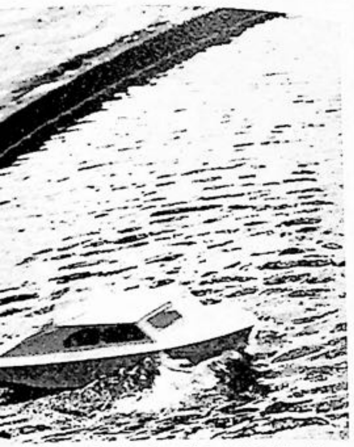


PERKASA

Photograph on left shows full size craft at speed.

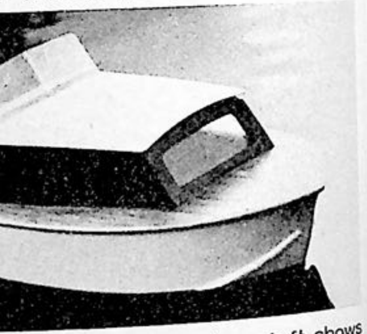
Superb scale model high speed torpedo boat for electric or I/C power (engines up to .61). Kit contains a wealth of accurately shaped parts. Materials for 'stand off scale' fittings, plan includes extra details for exact scale working.

34" PERKASA C-MAV10 46" PERKASA C-MAV11



vood boat of simple construction or engines up to 2½cc or electric uitable for either single or multi- adio control gear. Length 25".

. Complete with motor, rudder, oly, etc. Everything you need (except glue).



SA Photograph on left shows full size craft at speed.

del high speed torpedo boat for power (engines up to .61). Kit of accurately shaped parts. d off scale' fittings, plan includes exact scale working.

MAV10 46" PERKASA C-MAV11

RACE CARS

Model car racing offers the enthusiast the same excitement and satisfaction that attracts so many people to full size racing. All the skills and nerve of the racing driver are stretched to the limit when racing model cars as this is the only aspect of the modelling hobby which is directly competitive.

National race meetings are organised all over the country by the B.R.C.A. (British Radio Car Association) throughout the summer season, although most clubs run all the year round. The B.R.C.A. is well worth joining as it offers 3rd party insurance cover and a regular news sheet for around £2 a year.

A great deal of satisfaction can be obtained from building and running a model car without competing in races. The local car park or school playground is usually deserted on a Sunday and can make an excellent area for experimentation and practice.

BRCA
BRITISH
RADIO
CAR
ASSOCIATION

Models of cars for radio controlled racing must be 1/8th scale and a reasonable representation of the full size car. Maximum engine capacity is 0.214 cu. in. (3.5 cc). The engine must be silenced. Noise level at peak revs must not exceed 80dB at a distance of 10 metres.

There are three classes for National competition - FORMULA, SPORTS/GT and SALOON.

All cars must be fitted with a clutch and brake.

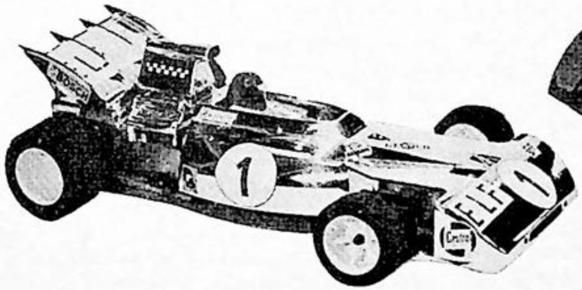
Cars must be controlled by proportional radio control equipment having at least two crystal frequencies.

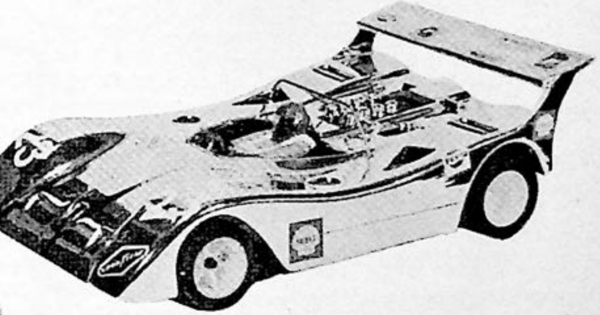
Maximum fuel tank capacity is 4 fluid ounces.

A driver figure must be fitted in all models when racing.

PB PRODUCTS

'RACING DOUBLE'





NEW - unique - dual kit for the Tyrell-Ford and the March 717. Two kits for the price of one! Race in both Formula 1 and GT classes with the one car, engine and R/C gear.

SPECIAL FEATURES

- Assembly of high standard engineered parts takes only a couple of hours and requires only the simplest of tools.
- Two tough ABS formed body shells allow dual use of car, these are instantly interchangeable and to accurate scale. The Tyrell Ford has simulated V.8 engine, cold box and aerofoil, the March 717 includes foil.
- Four Wheel suspension with full damping - adjustable friction at rear end and hysteresis on the front. The original rear suspension linkage maintains constant belt tension and eliminates rear axle steering.
- Completely new clutch assembly featuring needle roller bearings and circlip type spring recessed into shoes which requires no adjustment and prevents the possibility of spring coming into friction contact with housing. Single Stage belt drive ratio 4½ to 1.
- Light weight has now proven to be of advantage and this model weighs only approx. 4½ lb. including engine and R/C installation.
- The one piece pressed chassis is very strong and in fact the whole model is designed to take the hard knocks and tumbles of this sport.
- Special High grip foam tyres on new nylon shock absorbing spoked wheel hubs, the rear hubs have the main drive pulley moulded integrally.
- Very complete specification only requires .19 c.i. engine and two ch. R/C to be added. This includes such additional items as fuel tank, Quick Links, bellcranks, radio box, unique double expansion silencer for maximum power, driver and two sheets of transfers.

D-PB2 - Racing Double R/C Car

D-PB3003 - Racing Numbers Transfer (6 colours)

CHOOSING AN AIRSCREW

Every engine has an 'optimum' airscrew size. That is, a diameter and pitch which gives optimum performance. The main factors which determine the optimum airscrew are:-

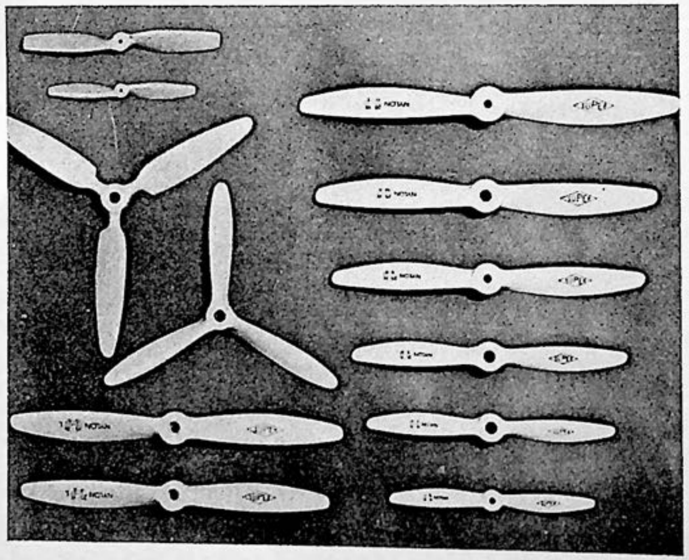
(i) Engine performance characteristics (and especially the rpm at which maximum power is developed).
(ii) Type of model.
(iii) Type of flying performance required.

To develop maximum power and thus maximum overall performance, the propeller size is chosen to allow the engine to develop an rpm figure in flight, corresponding to maximum BHP. This rpm figure can vary a lot with different engines. Some sports-type diesels, for example, develop maximum BHP at 10,000 rpm or under. Racing-type glow motors usually develop their maximum power at 15-18,000 rpm.

The rpm figure for maximum power can be found for a particular engine from its performance curves. These are published by some manufacturers in their instruction sheets. Independent test figures are published in engine test reports, appearing monthly in the magazines Aeromodeller, Radio Modeller and Radio Control Models.

An airscrew size to give maximum power in flight is the logical choice for a free flight contest model, a control line speed model or a R/C pylon racer. But there is an important difference between these model types. Free flight models normally require a relatively low pitch airscrew. Control line models require a high pitch airscrew.

The diameter size usually has the greatest effect on rpm developed. A larger diameter size can reduce the rpm developed quite markedly. An increase in pitch will have a similar (but less drastic) slowing effect; and vice versa.



NYLON - usually the preferred type. Strong and tough, but may have a tendency for blades to flex or deform slightly which can affect performance. Generally 'crash proof' - but not always so!

NYLON-FIBREGLASS - is a more rigid - and more expensive - material. Heavier than nylon, but often preferred by modellers because of their greater strength and durability.

WOOD - many experts insist that there is nothing to beat a wood airscrew where maximum performance is required. Easier to rework, too, for adjustments to performance. Very vulnerable to rough landings though. — But replacement cost is lower.

RECOMMENDED PROPELLER SIZES

ENGINE	FREE FLIGHT	CONTROL LINE	R/C
DC			
WASP	5 x 4 6 x 3	6 x 4	6 x 4
RAPIER	9 x 4 10 x 4	8 x 6 9 x 6	9 x 4 9 x 6
DART	6 x 4 7 x 4	6 x 4	6 x 4
MERLIN	7 x 4 8 x 4	6 x 4	7 x 4
SUPER MERLIN	7 x 4 8 x 4	6 x 4	7 x 4
SPITFIRE	8 x 4 9 x 4	7 x 6 8 x 4	8 x 4
SABRE	9 x 4	8 x 6	8 x 4 8 x 6
ME			
HERON	8 x 4	7 x 6 8 x 4	8 x 4 9 x 3
SNIPE	9 x 4	8 x 6	8 x 4 8 x 6
MERCO			
29	10 x 4	9 x 6 10 x 5	10 x 4
35	10 x 4	10 x 6	10 x 6 11 x 4
49	11 x 5 12 x 4	11 x 6	11 x 5 11 x 6
61	13 x 6	11 x 8	11 x 6 11 x 7
ENYA			
09	7 x 4 8 x 3	7 x 6 8 x 4	8 x 3 8 x 4
15	8 x 4	8 x 5 8 x 6	9 x 4
19	9 x 4	9 x 5 9 x 6	9 x 4 10 x 4
19BB	9 x 4	9 x 5 9 x 6	9 x 4 10 x 4
29	10 x 4 11 x 4	9 x 6 10 x 6	9x6 10x4
29BB	10 x 4 11 x 4	9 x 6 10 x 6	9x6 10x4
35	10 x 5 11 x 4	10 x 6	10 x 6 11 x 4
35BB	10 x 5 11 x 4	10 x 6	10 x 6 11 x 4
45BB	11 x 5 12 x 4	11 x 6	11 x 5 11 x 6
60BB	12 x 6 13 x 5	11 x 6 12 x 5	11x7 11x8
HP			
40R	10 x 4	10 x 6	9x8½ 9½x8½
40F	10 x 4	10 x 6	9x8½ 9½x8½
61R	-	-	11x7
61F	-	-	11x7
AUSTRO-WEBRA			
20	9 x 4 10 x 3½	9 x 6	9 x 4
61F	-	-	11 x 7
61R	-	-	11 x 7
GRAUPNER			
HB20	8 x 5 9 x 4	8 x 6 9 x 6	9 x 4
HB61	-	-	11x7
WANKEL	10 x 4	10 x 6	10 x 6

Note: pitch sizes are nominal

ZES

LINE	R/C
	6 x 4
6	9 x 4 9 x 6
	6 x 4
	7 x 4
	7 x 4
4	8 x 4
	8 x 4 8 x 6
4	8 x 4 9 x 3
	8 x 4 8 x 6
5	10 x 4
	10 x 6 11 x 4
	11 x 5 11 x 6
	11 x 6 11 x 7
	8 x 3 8 x 4
	9 x 4
	9 x 4 10 x 4
	9 x 4 10 x 4
	9x6 10x4 11x4
	9x6 10x4 11x4
	10 x 6 11 x 4
	10 x 6 11 x 4
	11 x 5 11 x 6
	11x7 11x8 12x6
	9x8½ 9½x8½ 10x6
	9x8½ 9½x8½ 10x6
	11x7 11x7¾ 12x6
	11x7 11x7¾ 12x6
	9 x 4
	11 x 7 12 x 6
	11 x 7 12 x 6
	9 x 4 9 x 6
	11x7 11x7¾ 12x6
	10 x 6 11 x 4

nominal.

AIRSCREWS

The airscrew for free flight thus generally has a relatively large diameter and low pitch. The same engine fitted to a control line model would require a smaller diameter airscrew with a higher pitch. The diameter and pitch size giving both the required engine rpm and the best model performance can only be determined by experience, or actual flight testing.

Where maximum engine performance is not necessary, there is usually an advantage in over-propping the engine - i.e. using a larger diameter and/or pitch than the size which gives maximum engine power. This can make the engine easier to handle for starting and adjusting. In other words the engine is rather more flexible and less likely to be affected by changes in the model's speed or flight path. Sports type models - those flown for fun, rather than in contests - and most R/C models come into this category. In the case of sports models, again the free flight model requires a lower pitch (and thus a larger diameter) than a control line model - mainly because the latter fly faster.

To simplify airscrew selection, use the Table given to find the recommended size to match a particular engine for free flight, control line, or R/C. Such a matching size may give you all the performance you want - e.g. for a 'sports' type performance. Where alternative sizes are given, try these and compare results.

For contest work you may need to try further sizes to aim an an 'optimum' airscrew. This can be done by flight testing other near propeller sizes. To increase the performance the answer is usually to fit a prop which increases engine rpm.

General rules to follow are:-

On a free flight model

(i) Try the same diameter with the next lower pitch.

(ii) Compare with the performance obtained from the next pitch size up and the next diameter size down.

Usually the best performance will be realised with the largest diameter size.

On an R/C model

As for free flight models. Here the rule of the biggest diameter giving -the best performance is usually more evident, provided the pitch is not reduced to too low a figure.

On a control line model

(i) Try reducing diameter sizes to increase the engine speed (and power output).

(ii) Try increasing pitch sizes to increase the model's flying speed.

This may mean reducing diameter size still further to maintain 'optimum' engine rpm.

(iii) Stop at moderate pitch values on aerobatic models. A high pitch airscrew can stall and lose thrust in manoeuvres.

Different makes of propellers can have different 'loading' effect on an engine, even if the same nominal size. There are several reasons for this - differences in blade shape, section and thickness, for example. Also some types of propellers are more efficient than others for particular jobs.

In fact a lot of experts 'rework' propellers for final 'matching'. Usually by thinning down the blade section - easy enough on a wooden prop (although it weakens it), but harder with nylon. Use glasspaper on a wood prop and a smooth flat file on nylon blades.

Note that the emphasis has been on flight testing to determine the 'optimum' airscrew size. You can easily measure the rpm an engine develops on the ground with particular propeller sizes, using a tachometer. But this is a very incomplete guide to airscrew matching. It takes no account of the effect of propeller pitch (since in a static test any airscrew is virtually running in a stalled condition). In flight, the rpm will increase quite substantially - the higher the pitch the greater the likely increase in rpm.

The Graupner electronic multimeter / rev counter is an indispensable tool for checking engines, props and fuel, etc. The meter is held up to the propeller against a light source daylight, torch, etc. not mains supply. The light sensitive cell measures the frequency with which the light is obstructed and gives a direct reading of RPM on the meter scale. Three ranges are available - 0 to 7000 rpm, 0-14000 rpm and 0-25000 rpm - for accurate reading from idle to peak revs. Note for 3-bladed props multiply the reading by 2/3.

RIPMAX–IP NYLON PROPELLERS

HI-TORQUE 2-BL TRACTOR

7" dia x 6"	E-IP636	10" dia x 6"	E-IP666
8" dia x 6"	E-IP646	11" dia x 7"	E-IP677
9" dia x 6"	E-IP656	11" dia x 7½"	E-IP678

HI-POWER 2-BL TRACTOR

7" dia x 4½"	E-IP734	10" dia x 5"	E-IP765
8" dia x 4½"	E-IP744	11" dia x 6"	E-IP776
9" dia x 4½"	E-IP754	11" dia x 7½"	E-IP779

METRIC/ENGLISH DIAMETER & PITCH EQUIVALENTS

Inches	3	3½	4	5	5¼	5½	6	6½	7	7½	7¾	8	8½	9	9½	10	11	12
mm	76	89	102	127	133	140	152	165	178	190	197	203	216	229	241	254	279	305

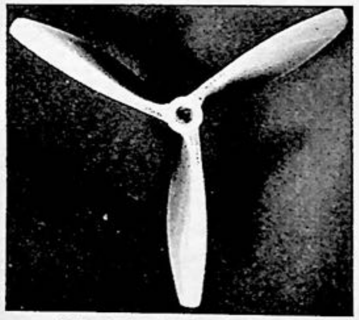
AIRSCREWS

TORNADO NYLON 2-BLADE TRACTOR

5" DIA ×	3"	E-XA53
	4"	E-XA54
5½" DIA ×	3"	E-XA553
	4"	E-XA554
6" DIA ×	3"	E-XA63
	4"	E-XA64
7" DIA ×	4"	E-XA74
	6"	E-XA76
	8"	E-XA78
8" DIA ×	4"	E-XA84
	6"	E-XA86
	8"	E-XA88
9" DIA ×	4"	E-XA94
	6"	E-XA96
	7"	E-XA97
	8"	E-XA98
10" DIA ×	4"	E-XA104
	6"	E-XA106
11" DIA ×	4"	E-XA114
	6"	E-XA116
	8"	E-XA118
12" DIA ×	4"	E-XA124
	5"	E-XA125
	6"	E-XA126

TORNADO NYLON 2-BLADE PUSHER

5½" DIA ×	3"	E-XB553
	4"	E-XB554
6" DIA ×	3"	E-XB63
6" DIA ×	4"	E-XB64
8" DIA ×	6"	E-XB86
9" DIA ×	6"	E-XB96
10" DIA ×	6"	E-XB106



TORNADO NYLON
3-BLADE PUSHER

6" DIA ×	3"	E-XE63

TORNADO NYLON
3-BLADE TRACTOR

5" DIA ×	3"	E-XC53
	4"	E-XC54
6" DIA ×	3"	E-XC63
	4"	E-XC64
7" DIA ×	8"	E-XD78
8" DIA ×	6"	E-XD86
	8"	E-XD88
9" DIA ×	6"	E-XD96
10" DIA ×	4"	E-XD104
	6"	E-XD106

KAVAN NYLON 2-BLADE TRACTOR

6" DIA ×	4"	E-FK57
7" DIA ×	4"	E-FK58
8" DIA ×	4"	E-FK59
	6"	E-FK60
9" DIA ×	4"	E-FK61
9" DIA ×	6"	E-FK62
10" DIA ×	4"	E-FK63
	6"	E-FK64
11" DIA ×	6"	E-FK65
	7¾"	E-FK66

D.C. QUICKSTART NYLON 2-BLADE TRACTOR

5¼" DIA ×	3½"	E-DCP53
6" DIA ×	4"	E-DCP64
7" DIA ×	4"	E-DCP74
8" DIA ×	4"	E-DCP84

TOPFLITE NYLON 2-BLADE TRACTOR

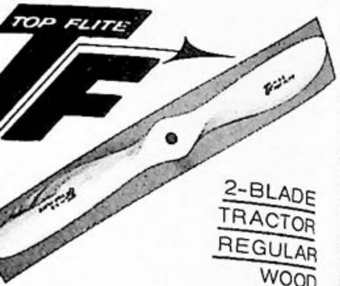
5¼" DIA ×	3"	E-TFP53
	4"	E-TFP54
6" DIA ×	3"	E-TFP63
	4"	E-TFP64
7" DIA ×	4"	E-TFP74
	6"	E-TFP76
8" DIA ×	4"	E-TFP84
	6"	E-TFP86
9" DIA ×	4"	E-TFP94
9" DIA ×	6"	E-TFP96
	7"	E-TFP97
10" DIA ×	3½"	E-TFP103
	6"	E-TFP106
11" DIA ×	4"	E-TFP114
	6"	E-TFP116
	7"	E-TFP117
	8"	E-TFP118
12" DIA ×	6"	E-TFP126

TOPFLITE PYLON RACING 2-BLADE TRACTOR

8½" DIA ×	8"	E-TFC8½8
	8½"	E-TFC8½8½
	9"	E-TFC8½9
9" DIA ×	7"	E-TFC97
	7½"	E-TFC97½
9" DIA ×	8"	E-TFC98
	8½"	E-TFC98½
	9"	E-TFC99
9½" DIA ×	8"	E-TFC9½8
	8½"	E-TFC9½8½
9½" DIA ×	9"	E-TFC9½9

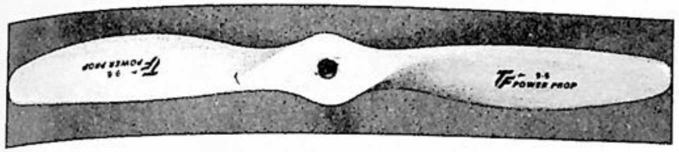
2-BLADE
TRACTOR
REGULAR
WOOD

6" DIA ×	3"	E-TFW63T
	4"	E-TFW64T
	5"	E-TFW65T
7" DIA ×	3"	E-TFW73T
	4"	E-TFW74T
	6"	E-TFW76T
8" DIA ×	3½"	E-TFW83T
	5"	E-TFW85T
	6"	E-TFW86T
	8"	E-TFW88T
9" DIA ×	4"	E-TFW94T
	5"	E-TFW95T
	6"	E-TFW96T
	7"	E-TFW97T
	8"	E-TFW98T
10" DIA ×	3½"	E-TFW103T
	5"	E-TFW105T
	6"	E-TFW106T
	8"	E-TFW108T
11" DIA ×	4"	E-TFW114T
	5"	E-TFW115T
	6"	E-TFW116T
	7"	E-TFW117T
	7¾"	E-TFW117¾T
	8"	E-TFW118T
	8¼"	E-TFW118¼T
12" DIA ×	4"	E-TFW124T
	5"	E-TFW125T
	6"	E-TFW126T
	8"	E-TFW128T
13" DIA ×	5½"	E-TFW135T
14" DIA ×	4"	E-TFW144T
	6"	E-TFW146T



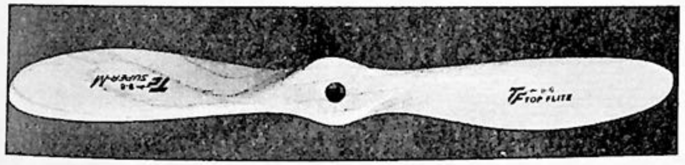
2-BLADE
TRACTOR
REGULAR
WOOD

" DIA ×	3"	E-TFW63T
	4"	E-TFW64T
	5"	E-TFW65T
" DIA ×	3"	E-TFW73T
	4"	E-TFW74T
	6"	E-TFW76T
" DIA ×	3½"	E-TFW83T
	5"	E-TFW85T
	6"	E-TFW86T
	8"	E-TFW88T
" DIA ×	4"	E-TFW94T
	5"	E-TFW95T
	6"	E-TFW96T
	7"	E-TFW97T
	8"	E-TFW98T
" DIA ×	3½"	E-TFW103T
	5"	E-TFW105T
	6"	E-TFW106T
	8"	E-TFW108T
" DIA ×	4"	E-TFW114T
	5"	E-TFW115T
	6"	E-TFW116T
	7"	E-TFW117T
	7¾"	E-TFW117¾T
	8"	E-TFW118T
	8¼"	E-TFW118¼T
' DIA ×	4"	E-TFW124T
	5"	E-TFW125T
	6"	E-TFW126T
	8"	E-TFW128T
' DIA ×	5½"	E-TFW135T
' DIA ×	4"	E-TFW144T
	6"	E-TFW146T



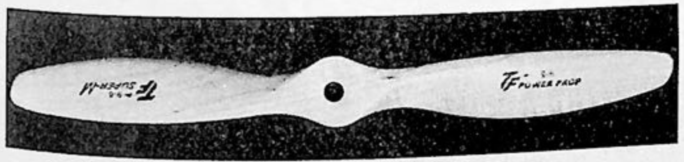
TOPFLITE "POWERPROP" REGULAR WOOD 2-BL TRACTOR

5¼" DIA	× 3"	E-TFW53P
	4"	E-TFW54P
6" DIA	× 3"	E-TFW63P
	4"	E-TFW64P
7" DIA	× 4"	E-TFW74P
	5"	E-TFW75P
	6"	E-TFW76P
8" DIA	× 4"	E-TFW84P
	5"	E-TFW85P
	6"	E-TFW86P
9" DIA	× 6"	E-TFW96P
9" DIA	× 8"	E-TFW98P
10" DIA	× 6"	E-TFW106P
	8"	E-TFW108P
11" DIA	× 4"	E-TFW114P
	6"	E-TFW116P
	8"	E-TFW118P
12" DIA	× 4"	E-TFW124P
	5"	E-TFW125P
	6"	E-TFW126P
	8"	E-TFW128P



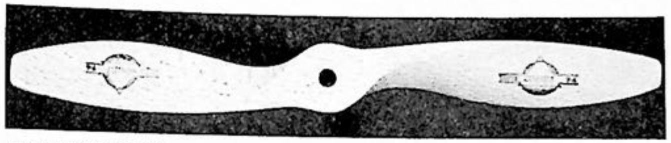
TOPFLITE "TOPFLITE" MAPLEWOOD 2BL TRACTOR

9" DIA	× 6"	E-TFM96T
10" DIA	× 6"	E-TFM106T
11" DIA	× 6"	E-TFM116T
11" DIA	× 7"	E-TFM117T
11" DIA	× 8"	E-TFM118T
12" DIA	× 6"	E-TFM126T
14" DIA	× 6"	E-TFM146T



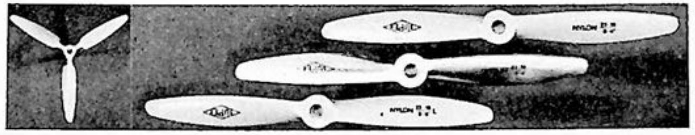
TOPFLITE "POWERPROP" MAPLEWOOD 2-BL TRACTOR

9" DIA	× 6"	E-TFM96P
10" DIA	× 6"	E-TFM106P
11" DIA	× 6"	E-TFM116P
11" DIA	× 7"	E-TFM117P
11" DIA	× 7½"	E-TFM117½P
11" DIA	× 7¾"	E-TFM117¾P
11" DIA	× 8"	E-TFM118P
12" DIA	× 6"	E-TFM126P



RIPMAX IRON BEECH SUPER CONTEST 2-BL TRACTOR

9" DIA	× 6"	E-PC96
	7"	E-PC97
10" DIA	× 5"	E-PC105
	6"	E-PC106
	7"	E-PC107
11" DIA	× 6"	E-PC116
	7"	E-PC117
11" DIA	× 7½"	E-PC117½
	7¾"	E-PC117¾
	8"	E-PC118
11½" DIA	× 6"	E-PC11½6
	6½"	E-PC11½6½
12" DIA	× 6"	E-PC126



GRAUPNER NYLON-FIBREGLASS 2-BL TRACTOR

5" DIA	× 2"	E-G1316/12/5
6" DIA	× 3"	E-G1316/15/7.5
	4"	E-G1316/15/10
	5"	E-G1316/15/12
	6"	E-G1316/15/15
7" DIA	× 3"	E-G1316/18/7.5
	4"	E-G1316/18/10
	5"	E-G1316/18/12
	6"	E-G1316/18/15
8" DIA	× 4"	E-G1316/20/10
	5"	E-G1316/20/12
	6"	E-G1316/20/15
9" DIA	× 4"	E-G1316/23/10
9" DIA	× 5"	E-G1316/23/12
	6"	E-G1316/23/15
	7"	E-G1316/23/18
9½" DIA	× 5"	E-G1316/24/12
10" DIA	× 3"	E-G1316/25/8
	4"	E-G1316/25/10
	5"	E-G1316/25/12
	6"	E-G1316/25/15
	7"	E-G1316/25/18
11" DIA	× 6"	E-G1316/28/15
	7"	E-G1316/28/18
	8"	E-G1316/28/20
12" DIA	× 6"	E-G1316/30/15

2-BL PUSHER

9" DIA	× 6"	E-G1317/23/15L
10" DIA	× 6"	E-G1317/25/15L

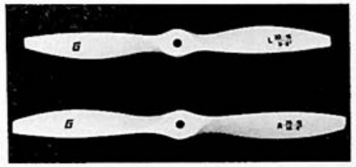
3-BL TRACTOR

8" DIA	× 6"	E-G160
10" DIA	× 5"	E-G161
5" DIA	× 3"	E-G4900/11

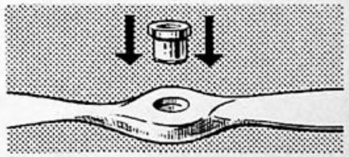
GRAUPNER SILVERED NYLON-FIBREGLASS 2-BL TRACTOR

9" DIA	× 4"	E-G1318/23/10
10" DIA	× 4"	E-G1318/25/10
11" DIA	× 7"	E-G1318/28/18
11" DIA	× 8"	E-G1318/28/20

GRAUPNER AHORN MAPLEWOOD



2-BL TRACTOR	dia		pitch
E-G60/25/15	10"	×	6"
E-G60/25/18	10"	×	7"
E-G60/28/15	11"	×	6"
E-G60/28/18	11"	×	7"
E-G60/28/20	11"	×	8"
E-G60/30/13	12"	×	5"
2-BL PUSHER	**dia**		**pitch**
E-G61/21/10L	8"	×	4"
E-G61/23/15L	9"	×	6"
E-G61/25/15L	10"	×	6"
E-G61/28/15L	11"	×	6"



GRAUPNER PROP BUSHES

E-G194	9 & 10mm to 6.5mm (pkt 10)
E-G196	9.9mm to 5.6mm (pkt 10)
E-G197	9.9mm to 6.1mm (pkt 10)
E-G200	5 & 6mm to 3.0mm (pkt 10)
E-G202	9 & 10mm to 4.9mm (pkt 10)
E-G203	5mm to 3.5mm (pkt 10)
E-G198	Assorted Prop Bushes (pkt 6)

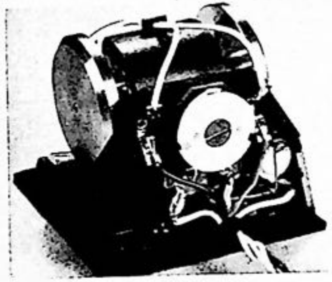
KAVAN AIRCRAFT ACCESSORIES

RIPMAX

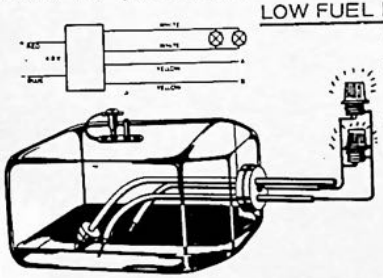
"NEW" KAVAN ITEMS

SPECIALLY FOR HELICOPTERS !

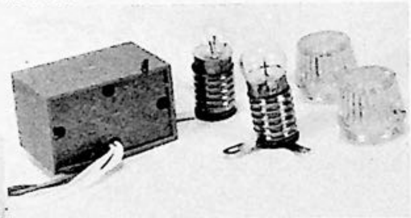
Virtually an auto-pilot ! The KAVAN GYROSCOPE connects to the tail rotor servo, senses movement about the yaw axis and automatically adjusts the tail rotor pitch to compensate. Prevents unexpected - and unwanted - yawing in flight due to changes in torque, wind, etc - which is the most difficult control to master when learning to fly helicopters. Suits all types of model helicopters.



LOW FUEL INDICATOR



Connects to two probes in the fuel tank and automatically indicates when fuel level is running low. A vital accessory on model helicopters where you dare not run out of fuel in the air !



BLINKING LIGHT SET

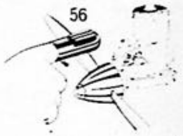
Electronic flasher control unit with four bulbs, bulb holders and domed bulb covers. Adds that extra touch of realism to any model in flight.

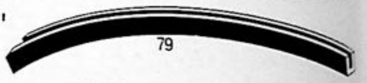
F-FK3901	Gyroscope	
F-FK3904	Blinking Light Set	
F-FK3905	" " "	Bulbs only
F-FK3905A	" " "	Lens Assy.
F-FK3906	Low Fuel Indicator	
F-FK3907	" " "	Bulbs only
F-FK3907A	" " "	Lens Assy.

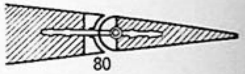
KAVAN ELECTRONIC

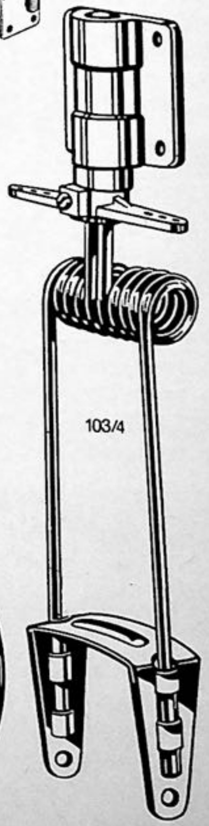
KAVAN AIRCRAFT ACCESSORIES

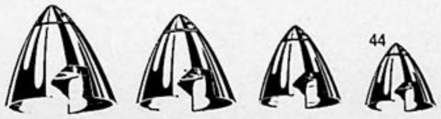
F-FK44	1¾" Silvered Nylon Spinner ¼" UNF
F-FK45	2 " " " " " "
F-FK46	2¼" " " " " "
F-FK47	2½" " " " " "
F-FK48	1¾" Silvered Nylon Spinner 7mm Thread
F-FK49	2 " " " " " "
F-FK50	2¼" " " " " "
F-FK51	2½" " " " "
F-FK55	Painted Pilot
F-FK56	Rubber Chicken Finger
F-FK77	Nylon Wing Fixing Bolts (pr)
F-FK79	Rubber Wing Seatings (pr)
F-FK80	¼" Control Surface Fairing (pr 32")
F-FK81	5/16" " " "
F-FK82	3/8" " " "
F-FK97	1¾" Standard Airspan Wheels (pr)
F-FK98	2 " " " " "
F-FK99	2¼" " " " "
F-FK100	2½" " " " "
F-FK101	2¾" " " " "
F-FK102	3 " " " " "
F-FK97W	1¾" Whitewall Airspan Wheels (pr)
F-FK98W	2 " " " " "
F-FK99W	2¼" " " " "
F-FK100W	2½" " " " "
F-FK101W	2¾" " " " "
F-FK102W	3 " " " " "
F-FK103	Short Steerable Nosegear
F-FK104	Long " "
F-FK105	Steerable Nosegear with Brake

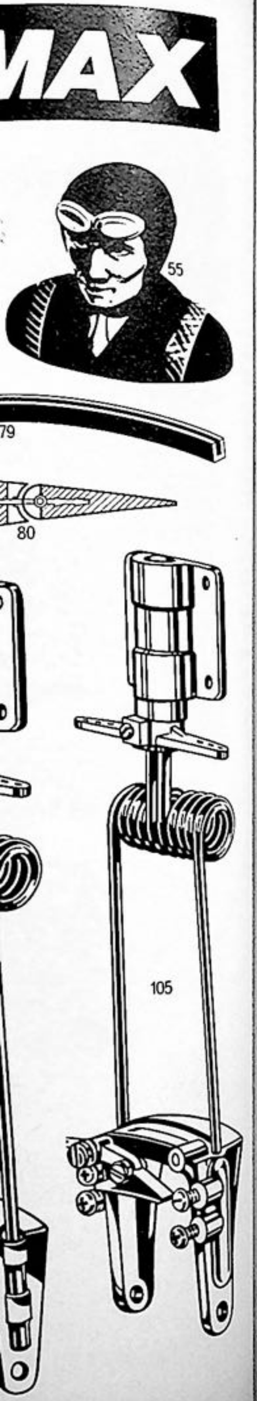




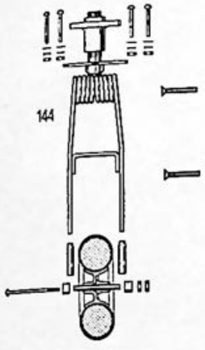


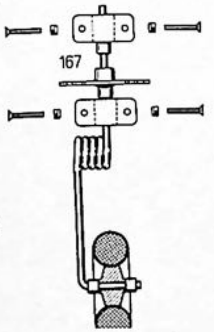


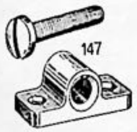


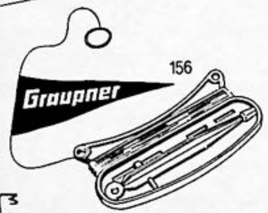


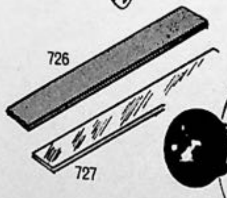
GRAUPNER AIRCRAFT ACCESSORIES

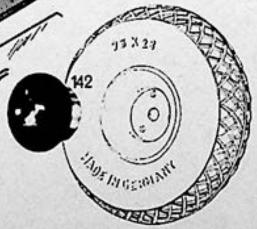




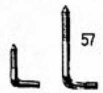


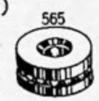




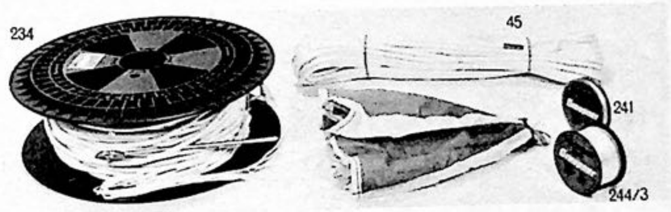


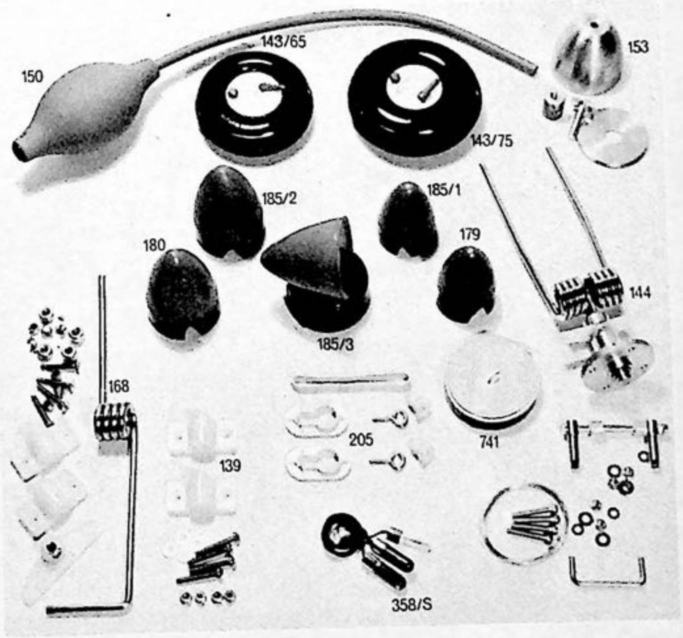
GRAUPNER AIRCRAFT ACCESSORIES

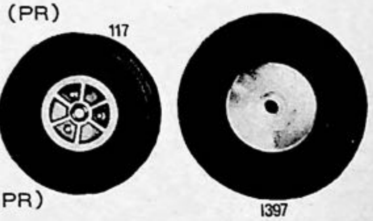




F-G57/1	Small Glider Tow Hook (pkt 10)
F-G57/2	Large " " " " "
F-G137	H/W Bulkhead Mount Steerable Nosegear
F-G144	H/W Belly Mount " "
F-G167	L/W Short Leg " "
F-G168	L/W Long Leg " "
F-G139	Noseleg Mounts (set 2)
F-G147	Wing Bolts (set 2)
F-G156	Tow Handle & Line
F-G163/44	1¾" (44mm) Air-X Wheels (pr)
F-G163/51	2" (51mm) " " "
F-G163/57	2¼" (57mm) " "
F-G163/64	2½" (64mm) " "
F-G163/70	2¾" (70mm) " "
F-G163/76	3" (76mm) " "
F-G128	2½" Plastic 2-Blade Spinner
F-G153	1½" Metal Uncut Spinner
F-G179	1¼" Plastic 3-Blade Spinner
F-G180	1½" " " " "
F-G185/1	1¼" Plastic 2-Blade Spinner
F-G185/2	1½" " " " "
F-G185/3	1¾" " " " "
F-G205	Knock-Off Wing Fasteners (set)
F-G233	New Tempo Glider Winch without Line
F-G241	Lightweight Line (reel 100M)
F-G243/2	Mediumweight Line (reel 200M)
F-G244/3	Heavyweight Line (reel 300M)
F-G234	Hi-Start Pack with Chute
F-G45	Braided Bungee Rubber only (30M)
F-G235	Full Length Pilot Doll
F-G358/S	Winking Light Set (Red, Green, White)
F-G565/15	1.5mm Ball Thrust Race (fit 16 SWG)
F-G565/2	2.0mm " " " (" 14 ")
F-G565/3	3.0mm " " " (" 12 ")
F-G726	Flat Brass Tube (1 metre)
F-G727	Flat Steel Strip (1 metre)
F-G741	Adhesive Sealing Tape (1 metre)
F-G142	Magnetic Wheel Brake
F-G143/65	65mm (2½") Air Elastic Scale Wheels
F-G143/75	75mm (3 ") " " " "
F-G150	Air Pump for Air Elastic Scale Wheels







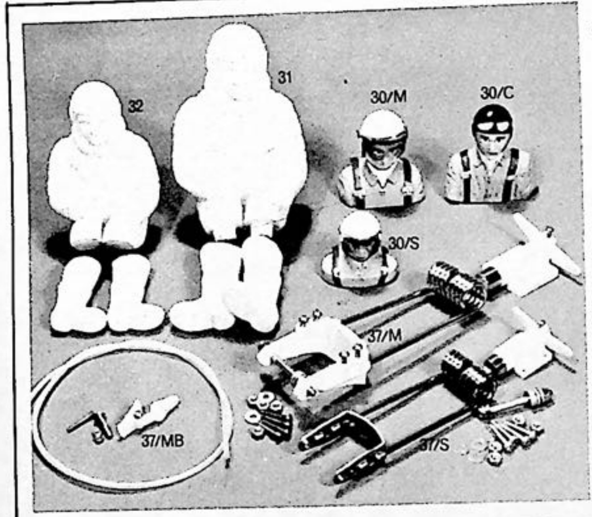
RECORD SPONGE WHEELS (PR)

F-G1397/0	30mm (1 1/8")
F-G1397/1	40mm (1½")
F-G1397/2	50mm (2")
F-G1397/3	60mm (23/8")
F-G1397/4	70mm (2¾")
F-G1397/5	90mm (3½")

RECORD SCALE WHEELS (PR)

F-G117/50	50mm (2")
F-G3565	Aircraft Rudder Bearing

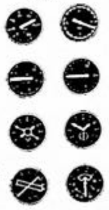
IM.. KBK.. PB.. MG.. AIRCRAFT ACCESSORIES



RIPMAX IM AIRCRAFT ACCESSORIES

F-IM30/C	1/8 Scale Painted Pilot
F-IM30/M	1/8 Scale Painted Pilot with Visor
F-IM30/S	1/12 " " " " "
F-IM31	1/8 Scale Full Length Pilot
F-IM32	1/10 " " " "
F-IM34/S	5mm & 7mm Cockpit Instruments Set
F-IM34/L	9mm & 12mm " " "
F-IM35/S	Small Cam Lock Fasteners (pr)
F-IM35/M	Medium " " " "
F-IM35/L	Large " " " "
F-IM36/IM	.15-.30 Low Wing U/C Pack
F-IM36/2M	.35-.45 " " " "
F-IM36/3M	.49-.61 " " " "
F-IM37/S	Lightweight Steerable Nosegear
F-IM37/M	Heavyweight " "
F-IM37/MB	Brake Assembly for IM37/M

34/S



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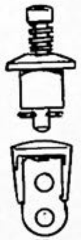

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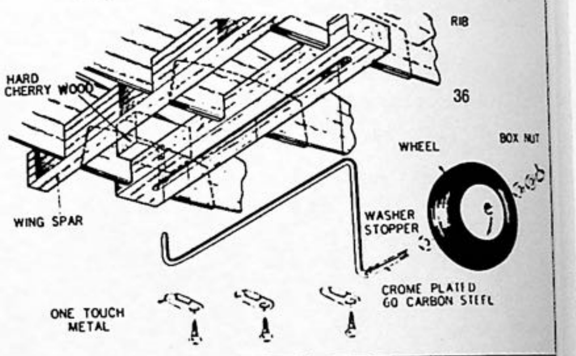
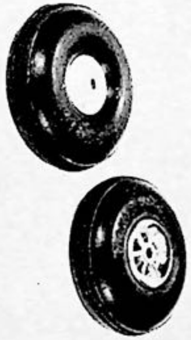




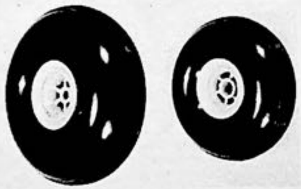
RIPMAX KBK AIRCRAFT ACCESSORIES

ALLYHUB TRU-SPIN AIRWHEELS (pr)

F-TS15	15mm (5/8")	F-TS20	20mm (3/4")
F-TS25	25mm (1")	F-TS30	30mm (1 1/8")
F-TS35	35mm (1 3/8")	F-TS40	40mm (1 1/2")
F-TS45	45mm (1 3/4")	F-TS50	50mm (2")

NYLONHUB TRU-SPIN AIRWHEELS (pr)

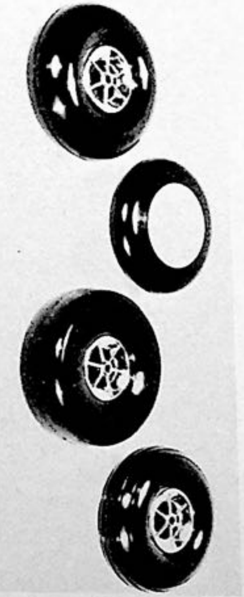
F-TS25N	25mm (1")	F-TS30N	30mm (1 1/8")
F-TS35N	35mm (1 3/8")	F-TS40N	40mm (1 1/2")
F-TS45N	45mm (1 3/4")	F-TS50N	50mm (2")
F-TS55N	55mm (2 1/8")	F-TS60N	60mm (2 3/8")



PB AIRCRAFT ACCESSORIES

AEROSCALE AIRWHEELS (pr)

F-AA175	1 3/4"	F-AA200	2"
F-AA225	2 1/4"	F-AA250	2 1/2"
F-AA275	2 3/4"	F-AA300	3"
F-AA325	3 1/4"	F-AA350	3 1/2"
F-AA400	4"	F-AA450	4 1/2"
F-AA500	5"		



RIPMAX MG AIRCRAFT ACCESSORIES

MG LOW BOUNCE AIRWHEELS (pr)

F-MG45	45mm (1 3/4")	F-MG50	50mm (2")
F-MG55	55mm (2 1/8")	F-MG60	60mm (2 3/8")
F-MG65	65mm (2 1/2")	F-MG70	70mm (2 3/4")
F-MG75	75mm (3")	F-MG80	80mm (3 1/4")

MG SLIMWHEELS (pr)

F-MG155	55mm (2 1/8")	F-MG160	60mm (2 3/8")
F-MG165	65mm (2 1/2")	F-MG170	70mm (2 3/4")
F-MG175	75mm (3")		

MG FLAT TOP SLICKWHEELS (pr)

F-MG260	60mm (2 3/8")	F-MG265	65mm (2 1/2")
F-MG270	70mm (2 3/4")	F-MG275	75mm (3")

MG TREADED AIRWHEELS (pr)

F-MG347	47mm (1 7/8")	F-MG350	50mm (2")
F-MG354	54mm (2 1/8")	F-MG357	57mm (2 1/4")
F-MG360	60mm (2 3/8")	F-MG365	65mm (2 1/2")
F-MG370	70mm (2 3/4")	F-MG375	75mm (3")
F-MG380	80mm (3 1/4")		

Note: wheel sizes are nominal only.

RIPMAX AIRCRAFT ACCESSORIES

MG TREADED SLICKWHEELS (pair)

F-MG462	62mm (2 3/8")	F-MG465	65mm (2 1/2")
F-MG470	70mm (2 3/4")	F-MG475	75mm (3")
F-MG900	Extra Wide Seating Tape (3 x 100 cms)		

RIPMAX CONTEST AIRWHEELS (pair)

F-CA20	20mm (3/4")	F-CA25	25mm (1")
F-CA30	30mm (1 1/8")	F-CA35	35mm (1 3/8")
F-CA40	40mm (1 1/2")	F-CA45	45mm (1 3/4")
F-CA50	50mm (2")		

RIPMAX AIRCRAFT ACCESSORIES

MULTICOLOUR SPINNERS

F-RA3	1 3/4" (45mm)	F-RA4	2" (50mm)
F-RA5	2 1/4" (56mm)	F-RA6	2 1/2" (62mm)

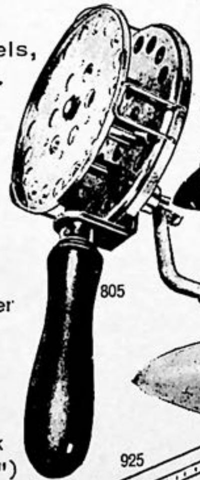
(colours:- white, red, blue, yellow)

F-RA9	Tailwheel Bracket
F-RK202/3	RAF Transfer Set (8 pieces)

Comprises 2 - 7" roundels, 2 - 6½" roundels, 2 - 4½" roundels and 2 - 5¼" fin stripes.

SCHUCO AIRCRAFT ACCESSORIES

F-U202/568	Cockpit Fittings Set
F-U202/570	30mm (1¼") Painted Pilot
F-U202/571	45mm (1¾") " "
F-U202/572	50mm (2 ") Unpainted "
F-U202/754	Cockpit Instruments Transfer
F-U202/805	Towline Winch
F-U202/966	Wing Bolt Set (pr)
F-U202/967	" " " "
F-U202/991	Hi-Start Parachute
F-U217/900	Pylon Engine Mt. with Tank
F-U257/925	Adhesive Seating Tape (78")
F-U745/204	Tow Handle with Line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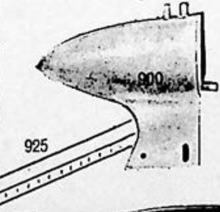

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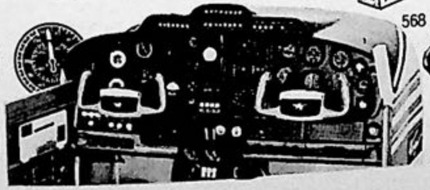
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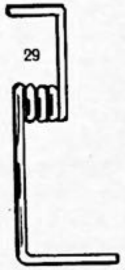
RIPMAX MK AIRCRAFT ACCESSORIES

	WHITE NYLON SPINNER
F-MK10	1¾"
F-MK11	2 "
F-MK12	2¼"
F-MK13	2½"
F-MK14	2¾"
	WHITE NYLON SAFETY SPINNER
F-MK15	1½"
F-MK16	1¾"
F-MK17	2 "
F-MK18	2½"
	FIXED NOSEGEAR
F-MK29/S	.09-.15
F-MK29/M	.19-.60
	STEERABLE NOSEGEAR
F-MK30/S	.09-.15
F-MK30/M	.19-.29
F-MK30/MW	.35-.45
F-MK30/L	.49-.61
	DURAL U/C WITH AXLES
F-MK31D	.09-.15
F-MK31/C	.19-.40
F-MK31/A	.45-.61
	RETRACT GEAR (pr)
F-MK41G	Main U/C
F-MK42G	Nose U/C
F-MK48G	Master Retract Servo
F-MK49G	Auxiliary Retract Servo
F-MK70/B	Nylon Wing Bolts (pkt 2)
F-MK70/C	Cam Lock Wing Fasteners (pkt 2)

15-18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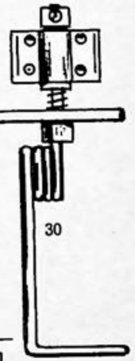
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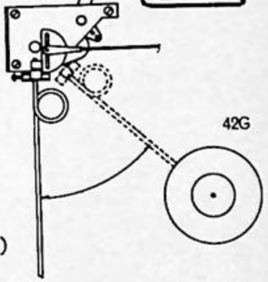
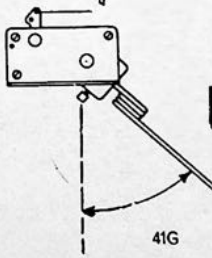
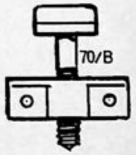
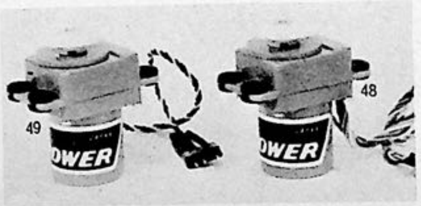

42G

70/C


41G


70/B

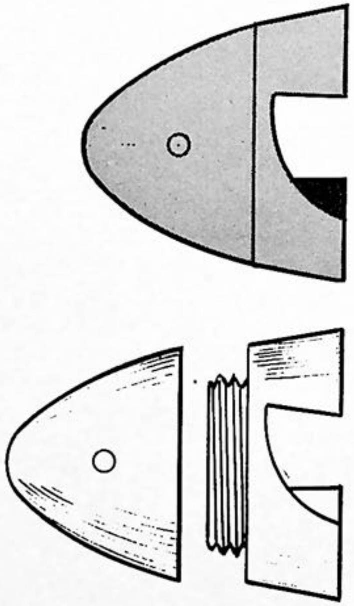


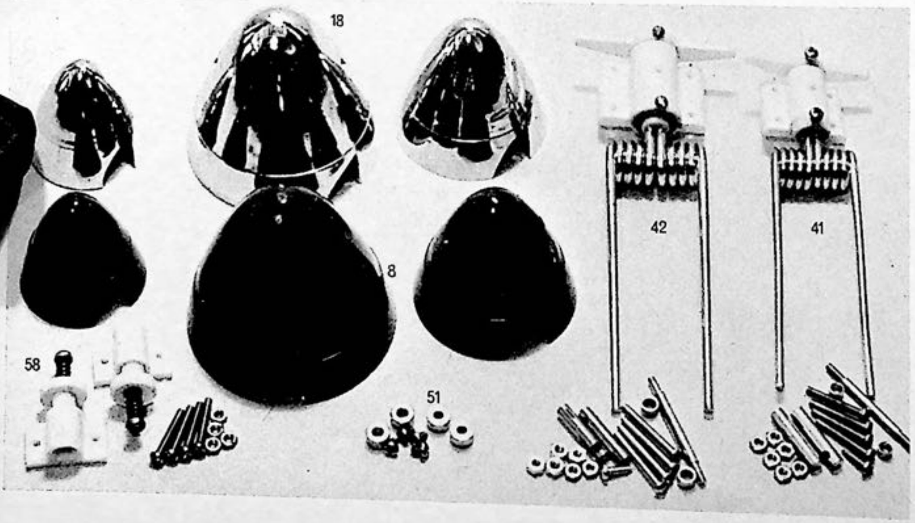
IP
AIRCRAFT ACCESSORIES

RIPMAX

RIPMAX IP AIRCRAFT ACCESSORIES

F-IP2	40mm (1½")	Coloured Centric Spinner
F-IP3	45mm (1¾")	" " "
F-IP4	52mm (2")	" " "
F-IP5	57mm (2¼")	" " "
F-IP6	62mm (2½")	" " "
F-IP7	70mm (2¾")	" " "
F-IP8	75mm (3")	" " "
F-IP12	40mm (1½")	Metalised Centric Spinner
F-IP13	45mm (1¾")	" " "
F-IP14	52mm (2")	" " "
F-IP15	57mm (2¼")	" " "
F-IP16	62mm (2½")	" " "
F-IP17	70mm (2¾")	" " "
F-IP18	75mm (3")	" " "
F-IP41	Lightweight Steerable Nosegear	
F-IP42	Heavyweight Steerable Nosegear	
F-IP51	3mm Wheel Collets (pkt 4)	
F-IP52	3.5mm " " (" ")	
F-IP53	4mm " " (" ")	
F-IP58	Side Mounted Cam Locks (pkt 2)	





POWER MODEL TIPS...

• • • • Make sure that engines are securely bolted to their bearers. Single nuts can vibrate loose - or even run right off the bolt. Use locknuts or double nuts (a second nut tightened down on the first nut).

• • • • Spinners sometimes come loose when using a starter for engine starting. To prevent this happening, smear the spinner cone thread with a non-hardening thread-locking adhesive, such as 'locktite'. Make sure that the threads are clean, dry and free from grease before applying the adhesive.

• • • • If an engine vibrates badly - and its mounting bolts are not loose - the cause is probably an unbalanced propeller. Often the fault will disappear if the propeller nut is slackened off and the prop then re-tightened in a different position. Try adjusting the propeller position 30 degrees at a time.

• • • • A generous smeared-on coating of epoxy adhesive all around the inside of the engine bay will not only add strength but make the engine bay structure completely fuelproof. Better than painting the engine bay with fuelproofer or a fuelproof dope, although this is the right thing to use for painting the inside of a separate compartment housing the fuel tank.

• • • • Check that wheel collets are properly tightened - otherwise you could lose a wheel. It is best to smear the end of the axle with epoxy adhesive before fitting the collets - then they will never come off. Be careful not to glue the wheel hub to the axles as well (a smear of oil on the hub will prevent excess epoxy sticking to it).

• • • • Keep your model clean! Wipe down with a clean, soft rag after each flying session to remove all traces of oily exhaust. Engines can be cleaned with a soft brush dipped into petrol or paraffin and then wiped dry with a cloth.

• • • • Use a filter in the fuel line between tank and engine. Remember to remove and clean this filter from time to time. Fuel should also be filtered (or pass through a filter) when filling the tank.

• • • • Make full use of the range of modern aircraft accessories available. They are not 'gimmicks'. They have been specially developed to meet a purpose - and make life easier when completing your model!

• • • • THIRD PARTY INSURANCE is a 'must' when you fly your models. See page 58 for details.

TIPS...

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locknuts or double nuts

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nodel !

fly your models. See

MISC. AIRCRAFT ACCESSORIES

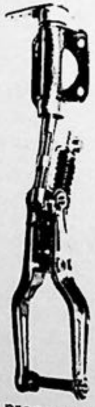
RIPMAX KSB TIMERS

Timers need to be accurate - and reliable. Especially for contest work. That's why we recommend KSB Timers with precision clockwork mechanisms at attractive low prices. Full range of times as shown - intermediate times can be set with high accuracy.

F-KSB6	6-Min Dethermaliser Timer
F-KSB20	20-Sec Fuel Cut-Off Timer
F-KSB30	30-Sec Fuel Cut-Off Timer

STEERABLE NOSEGEAR makes all the difference to ground handling - but it has to be tough and well sprung to take heavy landing loads. The Ripmax Scale-type nosegear shown here is just that, with stout wire leg, coil springing, nylon anchor/pivot unit. Look in the Index for other STEERABLE NOSEGEAR UNITS.

Ripmax SM Scale Steerable Nosegear - F-SM1

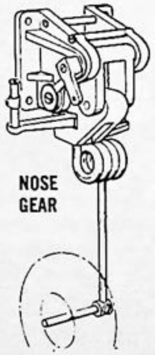


pressed steel moving components

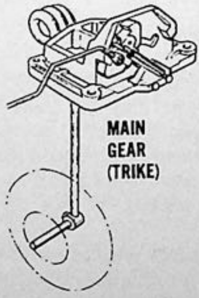
RETRACTS

For realism - and less drag in flight. You need an additional servo for 'retracts' which can be operated via a separate channel, or coupled to throttle and trim levers to work off 'throttle' control channel. For other RETRACTABLE UNDERCARRIAGES and RETRACT SERVOS see Index.

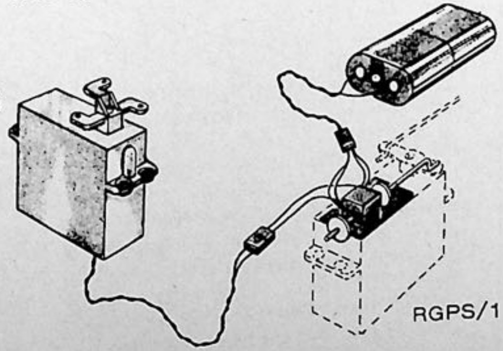
F-RG1	Goldberg	Nosegear only Retract U/C
F-RG2	"	Maingear only " "
F-RG3	"	Main & Nosegear " "
F-RG3/1	"	Retract Gear Spring Set
F-RGPS/1	"	" " Power System



NOSE GEAR



MAIN GEAR (TRIKE)



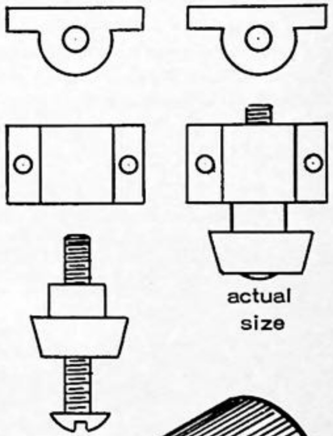
RGPS/1

MODERN WING FIXING

Designed for use where positive wing location is essential (or you want to eliminate unsightly rubber bands!) Vibration proof - and crash-proof (the anchor part pulls out of the model and can be refixed).

There are various types - like the Orient SCREWLOK shown - which match special anchor parts - quick-release fasteners, and nylon wing bolts, etc. You need to try several before you can decide the type you like best. Look for WING FASTENERS in the Index.

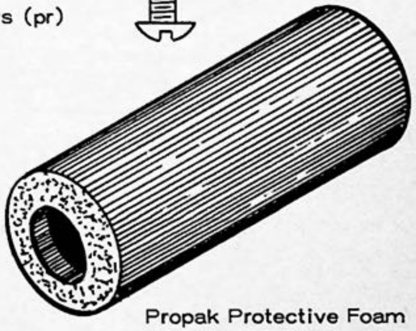
F-OA12 Orient Screw Lok Wing Fasteners (pr)



actual size

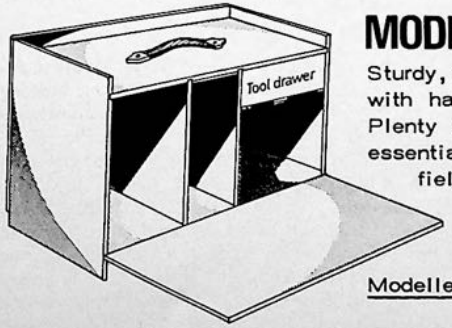
PROTECTIVE PACKING

Foam packing is a 'must' for receivers and batteries in any radio model installation. This special insulation-packing comes in 2½" diameter and handy 8" length. Cuts to length and splits open easily with a sharp knife to form a suitable overall wrapping.



Propak Protective Foam Packing F-EMH1

MODELLERS FIELD BOX



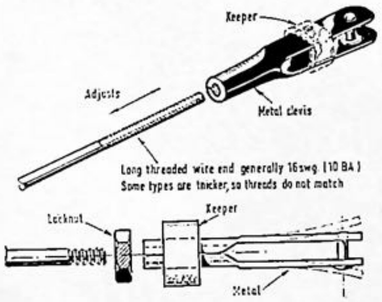
Sturdy, lightweight carrying box complete with handle and separate tool drawer. Plenty of accommodation for those essential items you need at the flying field. Comes packed flat ready to assemble.

Modellers Field Box cat no F-EHM2

CONTROL LINKAGES

Choice of suitable control linkages and their correct fitting is vital in any R/C installation. There can be unexpected snags, even when using proprietary fittings - so be guided by experts.

The following is extracted from THE PROPO BOOK (published by Radio Modeller), dealing with the subject of push rods. This book is the most complete - and fully practical - guide to radio installations yet published, and thoroughly recommended for further reading. Cat no W-RM1.


Keeper
Adjusts
Metal clevis
Long threaded wire end generally 16swg (10 BA)
Some types are thicker, so threads do not match
Locknut
Keeper
Metal

Nylon clevises, being more pliable, offer better protection to the servo in the event of a bad crash, as they will often wrench clear without damage. When using a nylon clevis on a stamped metal horn (such as the central elevator joiner type—see Chapter 10) always make certain to smooth off any rough burrs around the hole, as these could cut through the nylon pin and cause loss of control. If possible always use a nylon clevis on the engine end of the throttle linkage, as there is a great deal of vibration here and a throttle lever attached to a metal clevis induces electrical noise, which could interfere with sensitive receivers. For the same reason, never use a metal-to-metal joint, such as might be found when a metal horn or bellcrank is attached to a metal clevis, and never allow wire parts to rub against screws or other metal parts.

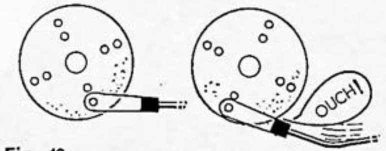


Fig. 49

Some earlier proportional outfits were so sensitive to this metal-to-metal noise that even a nylon clevis which had a metal *pin* has been known to give interference when connected to a metal horn or throttle arm. The answer, in such cases, was to remove the pin and solder it into the horn, then hook the clevis back over it. Nylon bushes are commercially available for inserting into metal control horns when using a metal clevis or pin-and-keeper. (There are more details about this bushing system, and other means of suppressing metal to metal noise, in Chapter 9.)

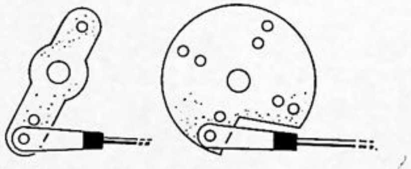


Fig. 50

If you try to use a commercial clevis on a disc output of a servo, you will find that, even if you are successful in clipping it on, it generally binds up solid when the disc rotates away from the direction of the push-rod—Fig. 49. This stalls the servo, because it prevents full movement in one direction. The answer is to cut the disc to clear it—or to use a lever output instead —Fig. 50. Nylon may be cut easily with a hot knife. Do not cut too near the holes or you risk having the clevis tear out under load. Special clevises with an extra long yoke are sometimes available from specialist shops and, naturally, these are to be preferred.

It is essential to use an adjustable clevis in each linkage—it doesn't matter at which end—but, if the neutral positions of the control surfaces (both, in the case of ailerons) are not adjustable, you will be very lucky indeed if your model does not need some linkage modifications before it flies " hands off."

It is not usual to have an adjustable clevis at *each* end of the push-rod. In fact, it is only rarely that this is desirable, and it is more usual to have the adjustable end positioned where it is most easily accessible.

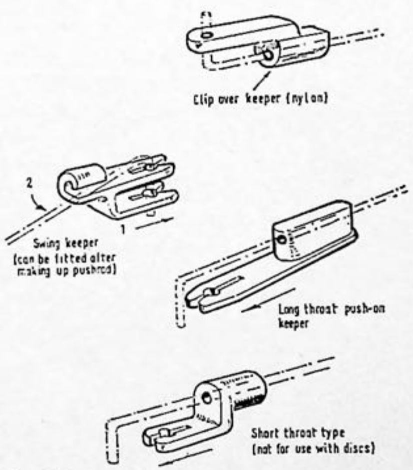

Clip over keeper (nylon)
2
1
Swing keeper (can be fitted after making up pushrod)
Long throat push-on keeper
Short throat type (not for use with discs)

Fig. 51

For instance, if the elevator has the horn on one side, it will be external and this is where the adjustable clevis would best be fitted. If, however, we are using a central elevator horn, with the connection inside the fuselage, then the adjustment will best be made at the servo end (albeit usually requiring the wing to be removed for access), so that is the logical place to fit the adjustable clevis.

For connections not requiring adjustment (mostly at the servo end, as we have said) there are various types of plastic " keeper " available in the shops—some of very ingenious design, for easy clip-on or swing-in fixing, thus allowing for speedy and simple removal of servos, for interchanging between models and so forth. Fig. 51 shows some examples of these.

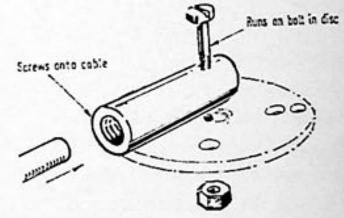


Fig. 52

Other Systems

Many ingenious alternative methods of linking a push-rod to a servo disc have been thought up and one for fixing ailerons (it can, of course, be adapted to other uses) is shown in the next chapter. Most of these devices are " one-offs " but a commercial unit for attaching a plastic cable end to a servo is shown in Fig. 52.

Various Junctions

There are obviously a large number of combinations in which the various types of clevises may be used, but the following cases are the most common, and show how the various types of linkages may be joined to either wire push-rods ends, or to the clevis itself.

Stranded wire cable to wire

The notched tube method may be used here (Fig. 53), but one must make sure that the solder does not make the stranded part rigid for too great a distance, as this would prevent it flexing, and possibly also increase its diameter enough to cause a jam.

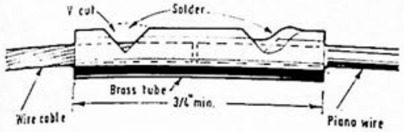


Fig. 53

Stranded cable to clevis

Some clevises are made of nylon and it is possible to fix a stranded wire cable direct to these. The method is to push the end of the cable into the hole occupied normally by the push-rod, then insert a steel modelling pin through the nylon at right-angles to the cable so that it passes between the strands. This spreads the strands apart and locks them in the clevis—Fig. 54. This is a modification of a nylon clevis which has been supplied with a metal push-rod, but there are now on the market several types of nylon clevis specifically designed to be fitted to cable. One has a circular hole in its side, through which a blob of solder may be secured to the end of the cable—Fig. 55. Another has a hollow piece of brass studding, which serves as the adjuster, into which the cable is sweated—Fig. 56.

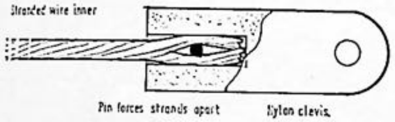


Fig. 54

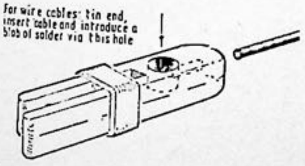

For wire cables: tin end, insert cable and introduce a blob of solder via this hole

Fig. 55

In the same way, metal clevises are obtainable with turned metal threaded ends which are hollow, to receive a cable —Fig. 57. Some cables are sold with these clevises ready soldered in place. It will be found neater and more satisfactory to use these specially made clevises, than to fit wire-ended ones to the cable, by binding and soldering the latter, though this may, of course, be done if nothing else is to hand.

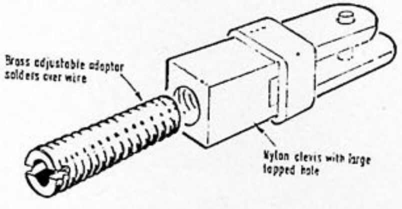

Brass adjustable adaptor solders over wire
Nylon clevis with large tapped hole

Fig. 56

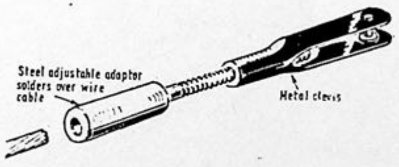


Fig. 57

Nylon or PTFE tube to wire

Nylon clevises intended for use with double tube ("Snakes") linkages have a short length of studding (threaded rod) of about $\frac{1}{16}$in. diameter, which serves both for an adjustment (by twisting the clevis on it) and attachment, by screwing it into the inner tube, where it cuts it own thread—Fig. 58. This makes a firm connection which you can test by suspending a weight from it. An alternative type for use with tubing of too small a bore to accept a threaded rod has a hollow threaded adaptor to screw onto the outside of the tube—Fig. 59.

It may be, however, that you require to fit, say, a wire-ended clevis—either metal or nylon—to the inner tube. In such a case, wires which are not already threaded (this is where the bicycle spokes come in !) could have a thread cut on them. For example, a 10BA thread for 16g wire. Screw-cutting dies are quite cheap and are a worthwhile addition to the modeller's toolbox. Do not use them on piano wire though, or they will not last long !

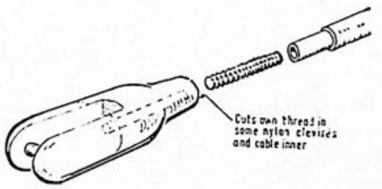


Fig. 58

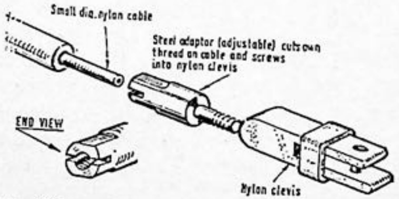

Small dia. nylon cable
Steel adaptor (adjustable) cuts own thread on cable and screws into nylon clevis
END VIEW
Nylon clevis

Fig. 59

If the wire is of so small a diameter that it slides straight into the tube, it should first be built up in thickness by adding a scrap of brass tube, or a coating of solder —Fig. 60. A neater way is to wind some thin copper wire over the end of the rod, and solder it, wiping it clean while the solder is still molten. This forms a primitive thread, but one which is adequate for locking into the cable—Fig. 61. Experiment with a different thickness of wire binding to achieve a good tight fit. In all these cases, it is a good idea to make the joint doubly secure by crimping the inner tube onto the wire with a single turn of copper wire, as shown in Fig. 62.

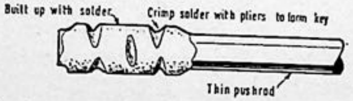


Fig. 60

Nylon tubes may be expanded to allow a wire which is of too large a diameter to be inserted. They will soften if held for a few seconds over a flame, when the wire should be inserted, and will shrink back as they cool and grip the wire tightly—Fig. 63. Additional security may be ensured by first notching the wire to key it into the softened tubing, and crimping.

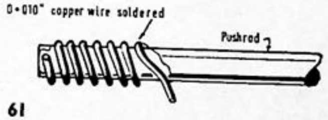


Fig. 61

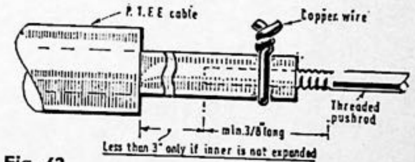


Fig. 62

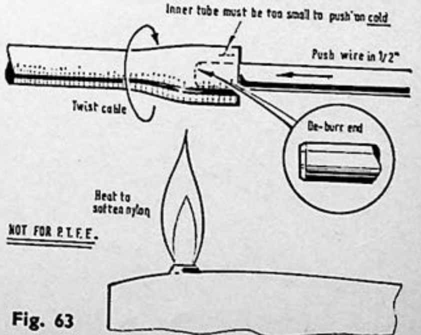
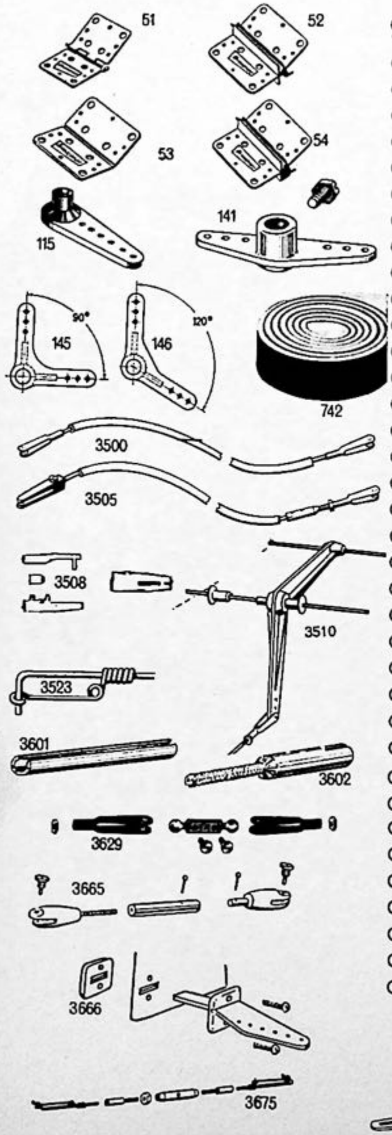


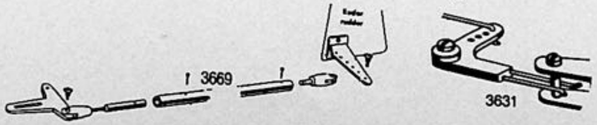
Fig. 63

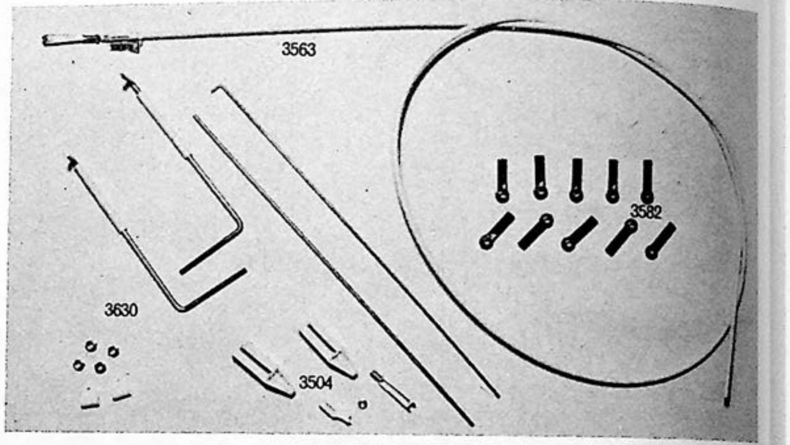
GRAUPNER
CONTROL ACCESSORIES

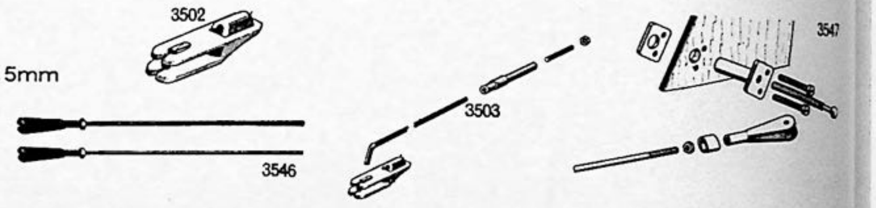


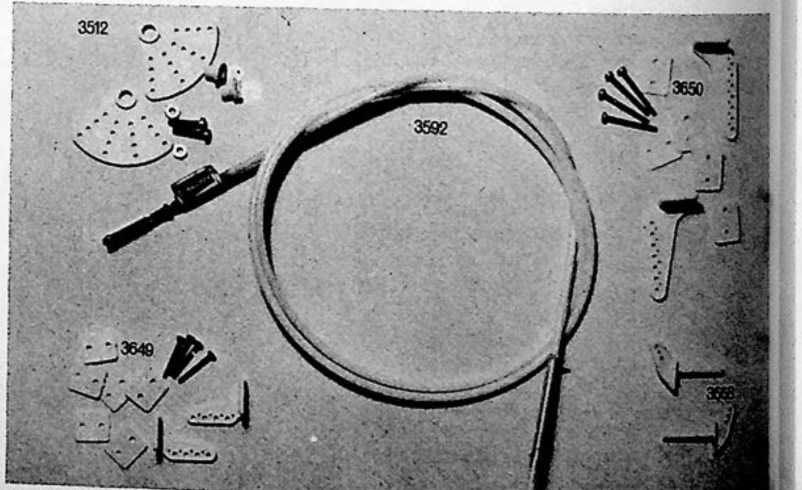
GRAUPNER CONTROL ACCESSORIES

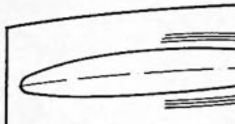
G-G51	Flat Nylon Hinge (pkt 20) 16 x 28mm
G-G52	Capped Nylon Hinge " 20 x 23mm
G-G53	One-Piece Poly " " 20 x 22mm
G-G54	Top-Edge Nylon " " 20 x 24mm
G-G115	Metal Control Arm (pkt 2) for 2mm rods
G-G141	Nylon Steering Crank (pkt 2) for 4mm axles
G-G145	90° Aileron Crank (pkt 2)
G-G146	120° " " "
G-G742	Adhesive Servo Tape (1 metre)
G-G3500	Bowden Cable with 2 Links
G-G3502	Klip-On Keeper (pkt 10) 1.5mm rod
G-G3503	Adjustable Throttle Linkage (200mm)
G-G3504	Push Rod End Link (pkt 2) fits 8mm sq
G-G3505	Plastic/Plastic Bowden with 2 Links
G-G3508	Bowden Cable Link only (pkt 10)
G-G3510	All-Moving Tailplane Crank
G-G3512	Quadrant Aileron Crank (pkt 2)
G-G3523	Wire Push Rod Retainer (pkt 10) fits 1.5mm
G-G3546	Kwiklink with Rod (pkt 2)
G-G3547	Horn with Snap-On Link
G-G3563	Wire/Plastic Bowden with Link
G-G3582	Ball & Socket Link (pkt 10)
G-G3592	Plastic/Plastic Bowden with Link
G-G3601	Wire/Wire Junction Sleeve (pkt 10)
G-G3602	Wire/Kwiklink Connector (pkt 10)
G-G3629	Snap-On Aileron Links Set
G-G3630	Screwlok Aileron Horns (pr)
G-G3631	Detachable Aileron Linkages (complete set)
G-G3649	Small Paired Rudder Horns (pr) length 22mm
G-G3650	Large " " " " " 36mm
G-G3665	Double Ended Moulded Link
G-G3666	Nylon Self-Locating Horn
G-G3668	Offset Plastic Aileron Horn (pkt 2)
G-G3669/5	5mm Extension Rod for G3665 (20")
G-G3669/7	7mm " " " " "
G-G3675	Double Ended Metal Linkage











Fairing in an el
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Kavan pre-shap
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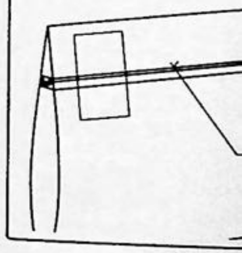

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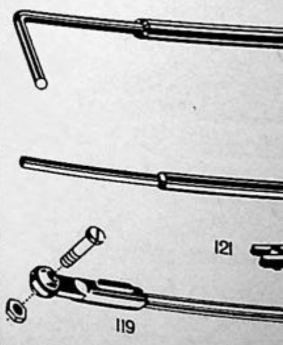
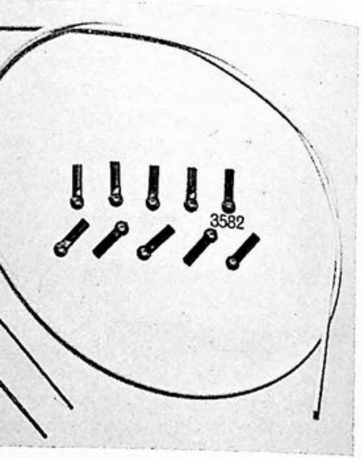
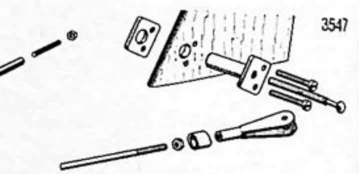
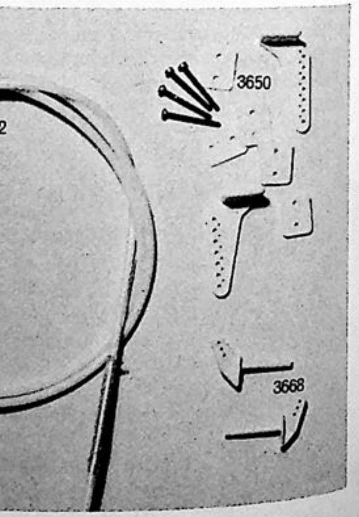
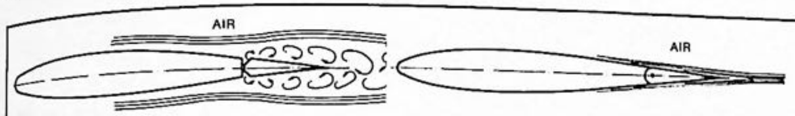


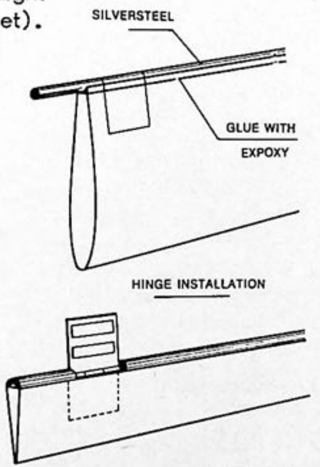


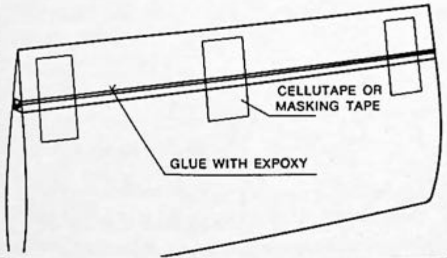




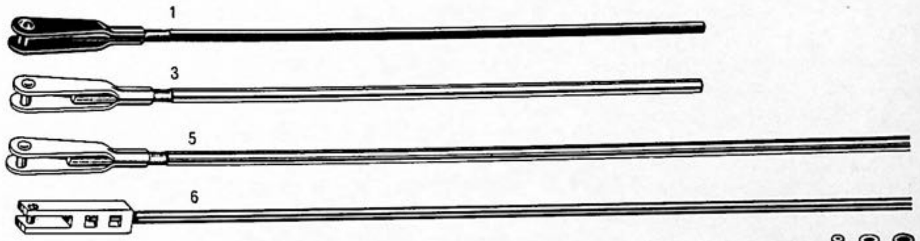


Fairing in an elevator or aileron reduces drag - makes the control surface more efficient in operation. Not so easy to do as it looks - unless you use Kavan pre-shaped fairing components. One part is glued to a squared off edge on the fixed surface (align with a straight metal rod and hold in place with tape until set). The rounded section glues to the control surface again using tape to hold until set. Finally fit hinges in the usual way (Kavan hinges specially recommended to go with Kavan control surface fairings).

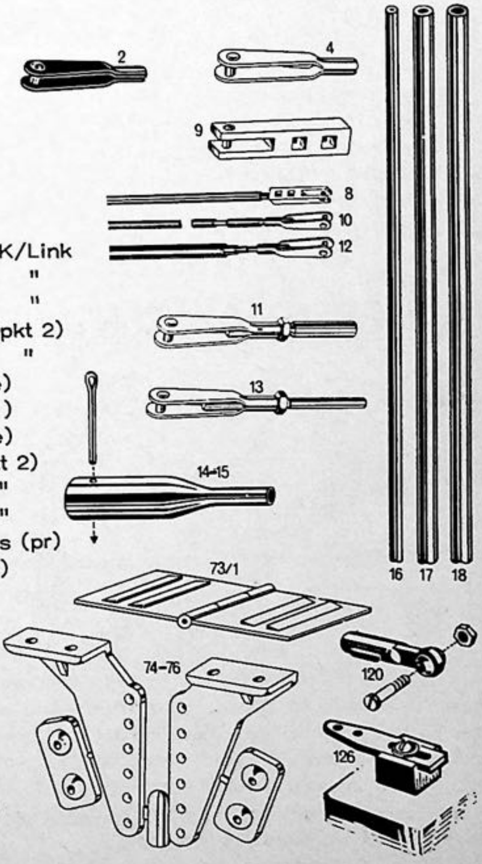




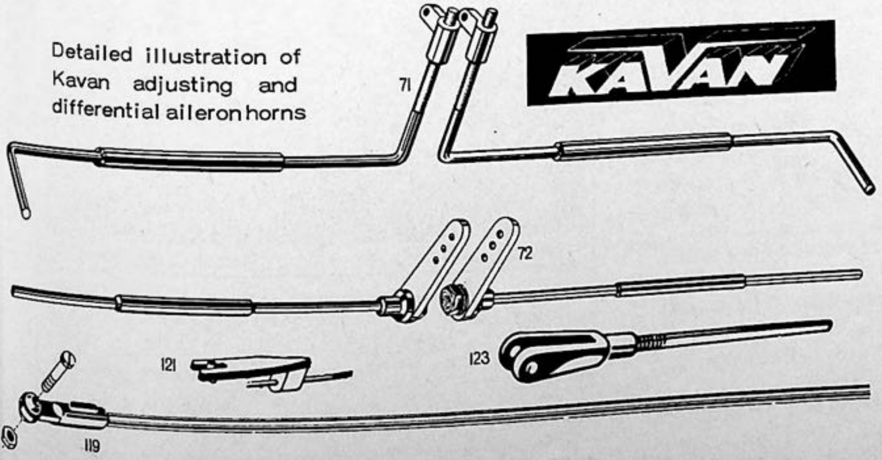
KAVAN AIRCRAFT CONTROL ACCESSORIES



G-FK1	Black Kwiklink with 5" Rod
G-FK3	Silver " " 5" "
G-FK5	Silver " " 8" "
G-FK6	Nylon " " 8" "
G-FK2	Black Kwiklink only (pkt 2)
G-FK4	Silver " " "
G-FK9	Nylon " " "
G-FK8	Lightweight Snake with Nylon K/Link
G-FK10	" " " Silver "
G-FK12	Heavyweight " " " "
G-FK11	K/Link with Large Connector (pkt 2)
G-FK13	" " Small " "
G-FK16	Small Snake Tube only (white)
G-FK17	Medium " " " (gold)
G-FK18	Large " " " (white)
G-FK14	Small Push-Rod End Cap (pkt 2)
G-FK15	Medium " " " " "
G-FK15/1	Large " " " " "
G-FK71	Screw Adjusting Aileron Horns (pr)
G-FK72	Differential Aileron Horns (pr)
G-FK73/1	Flat Nylon Hinge (pkt 10)
G-FK74	Short Nylon Horn (pr)
G-FK75	Medium " " "
G-FK76	Long " " "
G-FK119	Ball Link with 8" Rod
G-FK120	Ball Link only
G-FK121	Keeper with 8" Rod (pkt 2)
G-FK123	Nylon Snap Link with 8" Rod
G-FK125	" " " only (pkt 2)
G-FK126	Adjustable Servo Arm



Detailed illustration of Kavan adjusting and differential aileron horns

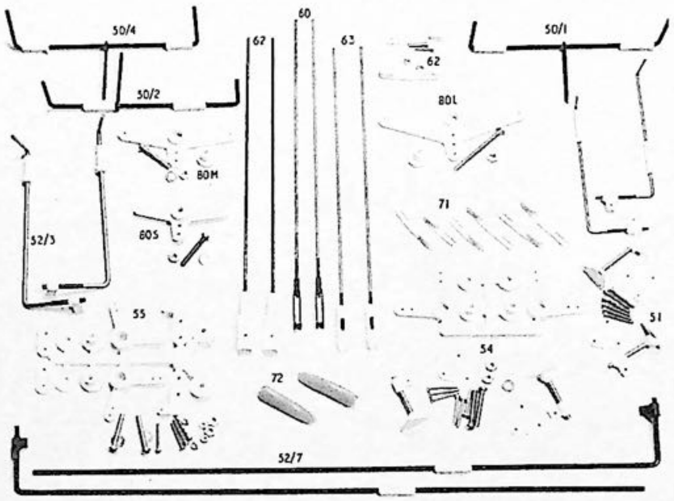


KAVAN

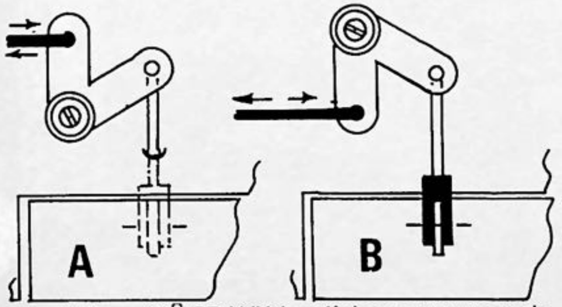
MK.. IM.. IP.. CONTROL ACCESSORIES

RIPMAX MK CONTROL ACCESSORIES

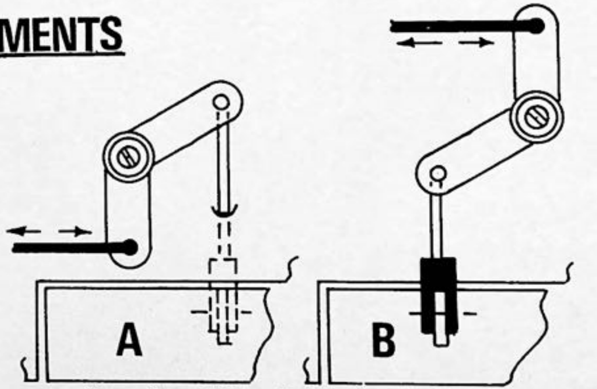
G-MK50/1	Elevator Centre Horn
G-MK50/3	" Off-Set Horn
G-MK50/4	" Differential Horn
G-MK51	Rudder Ajustahorn (pkt 2)
G-MK52/1	Small Aileron Ajustahorn (pr)
G-MK52/3	Large " " (")
G-MK52/7	Long " " (")
G-MK54	90° Cranks with Ajustahorns (set 4)
G-MK55	120° Cranks with Accessories (pr)
G-MK60	Long Yoke K-Link (pkt 2)
G-MK61	Set K-Links with Rods & Keepers
G-MK62	Push-Rod Holder with Keeper (pkt 2)
G-MK63	Nylon Kwik Link (pkt 2)
G-MK71	Kwik Keepers (pkt 6)
G-MK72	Faired P/Rod Exit Guides (pkt 2)
G-MK80/S	2" Nylon C/L Bellcrank
G-MK80/M	2½" " " "
G-MK80/L	3" " " "



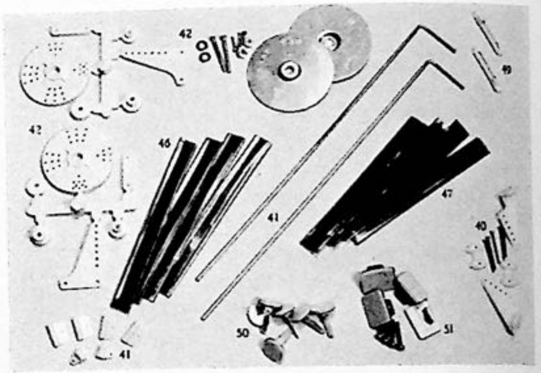
DIFFERENTIAL CONTROL MOVEMENTS



Using a 60° CRANK two linkage arrangements are shown here for producing a differential aileron movement (more 'up' than 'down'). Operating push rod shown in solid black with arrows indicating movement. In configuration A the horn is mounted on the bottom of the aileron. In B, the horn must be on top.

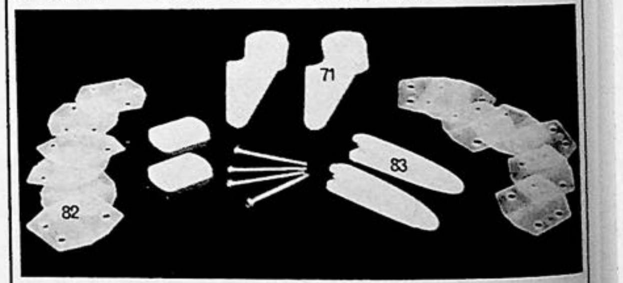


Smoother differential movements are usually produced by a 120° CRANK. Here two standard arrangements for linkage are shown. In A the horn is mounted on the bottom of the aileron. In B, the horn is mounted on top. Both movements give more 'up' than 'down'.
RIPMAX MK cranks are complete with accessories.



RIPMAX IM CONTROL ACCESSORIES

G-IM40	Nylon Rudder Horn (pkt 2)
G-IM41	Screw Adjusting Aileron Horns (pr)
G-IM42	Differential Ailerons Crank Kit
G-IM46	Large Push-Rod Grip Tube (pkt 18")
G-IM47	Small " " " " (" ")
G-IM49	Semi-Hooded P/Rod Exit Guide(pkt 2)
G-IM50	Justik Cable Anchors (pkt 6)
G-IM51	Justik Servo-Rail Supports (pkt 4)



RIPMAX IP CONTROL ACCESSORIES

G-IP71	Small Rudder Horns (pkt 2)
G-IP72	Large " " (" ")
G-IP81	Small Polypropylene Hinges (pkt 18)
G-IP82	Large " " (" ")
G-IP83	Hooded Push Rod Exit Guides (pkt 2)

RIPMAX

CONTROL ACCESSORIES RIPMAX, RAND, MISC.

Standard HORNS are available in many sizes but all follow the basic pattern and screw onto a backing plate through the surface. Choose from G3649 and G3650 small and large with wedges for a tapered surface. G3666 self locating with a tongue which passes through the surface; FK74, 75 & 76; RA30 in three colours; IP71, IP72 and IM40 all of standard pattern; and U206/627 an extra long horn. A new type is MK51 the ajustahorn with a tag on a screw to adjust the length; also G3547 an adjustable ball and socket horn for raked surfaces supplied with all accessories. For the two piece elevators there is MK50/1, MK50/3 which has the horn offset to allow the pushrod to exit through the side of the fuselage and MK50/4 which has the horn rated for differential movement. For inset ailerons G3668 is a small raked horn. Strip ailerons require a matched pair of horns generally now of the ajustahorn type, G3630 and FK71 - also MK52/1 MK52/3, MK52/7 and IM41.

LIGHTWEIGHT LINKAGES are only suitable for small models and gliders. G3500 is supplied with 2 kwiklinks but requires assembling. G3505 is supplied with one fixed adjustable kwiklink and a nylon keeper. G3592 is a high temperature type for use near silencers, etc. FK8 has one nylon kwiklink and FK10 is similar but with a metal adjustable kwiklink assembled. FK12 is the heavyweight of the range. Where very precise operation is required in straight runs, G3563 has a metal inner in a nylon outer with a metal adjustable kwiklink. Standard snakes cannot go round tight curves. For this try braided wire bowden cable no. RA309 which is particularly useful for noselegs or throttles, etc.

Standard metal adjustable kwiklinks come under the numbers G3546, FK1, 3, 5, all complete with metal rods. FK2 and 4 are black and silver kwiklinks only. Nylon adjustable kwiklinks are used to avoid metal to metal joints. FD6, FK123 and MK63 are of this type. MK60 is a metal only kwiklink with a very long yoke for servo disc outputs. A new type very useful for throttles or rakèd surfaces is the ball and socket link OA10 and FK119 (complete with threaded rod). G3582 and FK120 are the ball and socket joint only. It is usual to use a kwiklink at one end of the pushrod only, the other end uses a keeper. G3523 is a metal keeper of traditional design with a long yoke. G3502 and A1021 are small swing keepers. FK121, MK72 are push keepers with a long throat. MK71 is similar but in two sizes in the packet. Packs of complete linkages are available. Look for G3665 and G3675 from Germany and MK61.

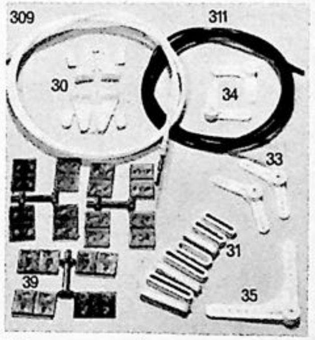
Note: the following identifies product code letters with manufacturers:-

A	- Rand	DC	-	Davies Charlton	FK	-	Kavan
G	- Graupner	IM	-	IM	IP	-	IP
MG	- MG	MK	-	MK	OA	-	Orient
RA	- Ripmax	U	-	Schuco			

MISCELLANEOUS CONTROL ACCESSORIES

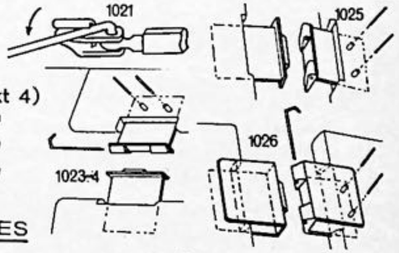
RIPMAX CONTROL ACCESSORIES

G-RA30	Multicolour Rudder Horns (pkt 2 prs)
G-RA31	Multicolour Exit Guides (pkt 8)
	Select the colour to suit your model (colours:- white, red, yellow)
G-RA33	120° Crank (pkt 2)
G-RA34	90° Crank (pkt 2)
G-RA35	90° Crank Extra Large
G-RA39	Polypropylene Hinges (pkt 12)
G-RA309	Superslip Bowden Cable (54")
G-RA311	" Tube only (48")



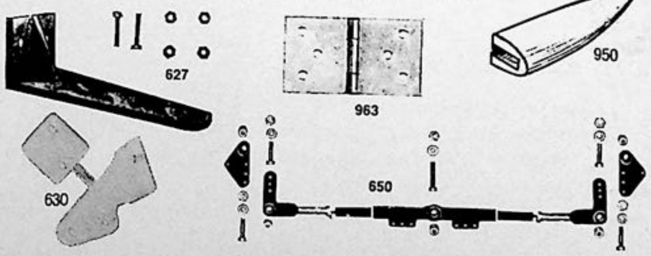
RAND CONTROL ACCESSORIES

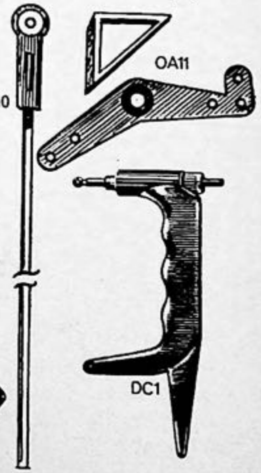
G-A1021	Swing-in Keeper (pkt 4)
G-A1023	3/16" Neutral Axis Hinge (pkt 4)
G-A1024	1/4" Neutral Axis " "
G-A1025	1/4" Top Edge " "
G-A1026	1/8" Slip Over " "



MISCELLANEOUS CONTROL ACCESSORIES

G-OA10	Orient Ball-Joint K-Link (pkt 2)
G-OA11	" 135° Aileron Crank & Bracket
G-U202/627	Schuco Extra Long Control Horn
G-U202/630	" Fuselage Horn Set
G-U202/650	" Slip-Out Aileron Linkage
G-U202/963	" Nylon Hinge (pkt 10)
G-MG950	Ripmax MG P/Rod Exit Guide (pkt 2)
G-DC1	DC Alloy Control Line Handle





MARINE PROPELLERS

RIPMAX BLACK NYLON 2-BLADE SCALE

H-MP52	1½" dia x 2" pitch L/H 4BA
H-MP53	1¾" dia x 3" pitch L/H 4BA

RIPMAX BLACK NYLON 3-BLADE SCALE

H-MP56	1½" dia x 1¾" pitch L/H 4BA
H-MP57	1¾" dia x 2¼" pitch L/H 4BA
H-MP65/L	2½" dia x 2½" pitch L/H 4BA
H-MP65/R	2½" dia x 2½" pitch R/H 4BA

RIPMAX METAL PLATED 3-BLADE SCALE

H-MP46	1¼" dia x 1" pitch L/H 4BA
H-MP47	1½" dia x 1½" pitch L/H 4BA

RIPMAX GREY NYLON 2-BLADE RACING

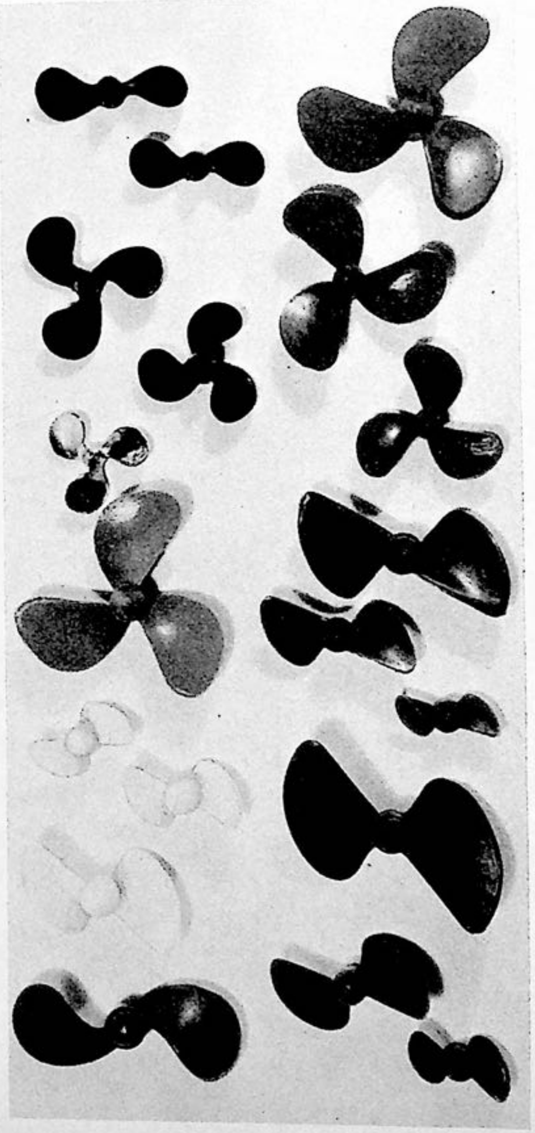
H-MP30	1¼" dia x 1¾" pitch L/H 4BA
H-MP40	1½" dia x 2" pitch L/H 4BA
H-MP50	2" dia x 2½" pitch L/H 4 BA
H-MP62	2½" dia x 3" pitch L/H 4BA

AUSTRO-WEBRA WHITE NYLON 2-BLADE RACING

H-AW1193	30mm dia (1 1/8") L/H M4 (4BA)
H-AW1194	35mm dia (1 3/8") L/H M4 (4BA)
H-AW1195	40mm dia (1½") L/H M4 (4BA)
H-AW1195/1	40mm dia (1½") L/H M5 (2BA)
H-AW1196	45mm dia (1¾") L/H M4 (4BA)
H-AW1196/1	45mm dia (1¾") L/H M5 (2BA)
H-AW1197	50mm dia (2") L/H M4 (4BA)
H-AW1197/1	50mm dia (2") L/H M5 (2BA)

GRAUPNER RED NYLON 2-BLADE SCALE

H-G1382/0	40mm dia (1½") L/H M4 (4BA)
H-G1382/0A	40mm dia (1½") R/H M4 (4BA)
H-G1382/1	50mm dia (2") L/H M4 (4BA)
H-G1382/1A	50mm dia (2") R/H M4 (4BA)
H-G1382/6	65mm dia (2½") L/H M5 (2BA)



GRAUPNER RED NYLON 3-BLADE SCALE

H-G1382/2	30mm dia (1 1/8") L/H M2
H-G1382/2A	30mm dia (1 1/8") R/H M2
H-G1382/3	50mm dia (2") L/H M4 (4BA)
H-G1382/3A	50mm dia (2") R/H M4 (4BA)
H-G1382/4	55mm dia (2¼") L/H M4 (4BA)
H-G1382/4A	55mm dia (2¼") R/H M4 (4BA)
H-G1382/5	40mm dia (1½") L/H M4 (4BA)
H-G1382/5A	40mm dia (1½") R/H M4 (4BA)
H-G1382/7	65mm dia (2½") L/H M5 (2BA)
H-G1382/7A	65mm dia (2½") R/H M5 (2BA)
H-G1382/8	20mm dia (¾") L/H M2
H-G1382/9	25mm dia (1") L/H M2
H-G1382/9A	25mm dia (1") R/H M2
H-G1382/10	60mm dia (2 3/8") L/H M4 (4BA)
H-G1382/11	45mm dia (1¾") L/H M4 (4BA)
H-G1382/11A	45mm dia (1¾") R/H M4 (4BA)

GRAUPNER RED NYLON 2-BLADE STANDARD RACING

H-G451/1	30mm dia (1 1/8") L/H M4 (4BA)
H-G451/2	35mm dia (1 3/8") L/H M4 (4BA)
H-G451/3	40mm dia (1½") L/H M4 (4BA)
H-G451/4	45mm dia (1¾") L/H M4 (4BA)
H-G451/5	50mm dia (2") L/H M4 (4BA)
H-G451/6	50mm dia (2") L/H M5 (2BA)
H-G451/7	55mm dia (2¼") L/H M4 (4BA)
H-G451/8	55mm dia (2¼") L/H M5 (2BA)
H-G451/9	62mm dia (2½") L/H M4 (4BA)
H-G451/10	62mm dia (2½") L/H M5 (2BA)

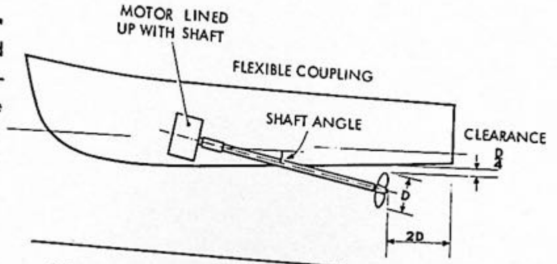
GRAUPNER RED NYLON 2-BLADE 'X' TYPE RACING

H-G455/1	30mm dia (1 1/8") L/H M4 (4BA)
H-G455/2	35mm dia (1 3/8") L/H M4 (4BA)
H-G455/3	40mm dia (1½") L/H M4 (4BA)
H-G455/4	40mm dia (1½") L/H M5 (2BA)
H-G455/5	45mm dia (1¾") L/H M4 (4BA)
H-G455/6	45mm dia (1¾") L/H M5 (2BA)
H-G455/7	50mm dia (2") L/H M5 (2BA)
H-G455/8	70mm dia (2¾") L/H M5 (2BA)
H-G455/9	50mm dia (2") L/H M4 (4BA)
H-G455/10	70mm dia (2¾") L/H M4 (4BA)

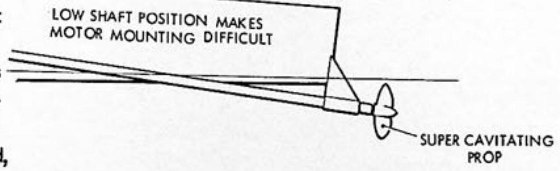
MARINE PROP GUIDE

GEN ON WATERSCREWS.....

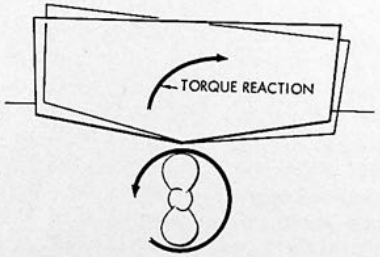
As a general rule, propellers are best mounted underneath the hull in a position about 2 diameters in from the transom. Clearance with the hull bottom need not exceed one quarter of the diameter, and can be a little less, in order to reduce the shaft angle.



Exceptions may sometimes be made in the case of high speed boats. There is a theoretical advantage in 'breaking' the propeller shaft with a universal coupling so that the propeller shaft is horizontal. An alternative approach is to locate the propeller aft of the transom, since this enables the shaft angle to be reduced. In this case a super cavitating propeller is needed, or means of combating cavitation and aeration if a conventional propeller is employed.

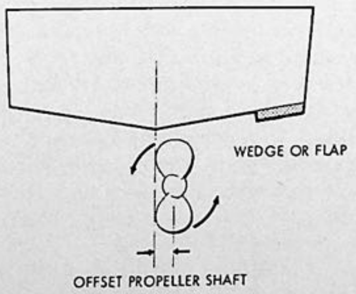


On the basis that the greater the depth of immersion of the propeller the greater the load, there is an advantage in designing for minimum immersion where low power units are being used - e.g. electric motors. This will enable the motor to be run at 'optimum speed'. Where plenty of power is available, as with i/c engines, cavitation is usually more important than depth of immersion as a performance parameter.



Torque is another important factor to consider, especially with high power motors. Torque is simply the reaction generated to propeller rotation, tending to roll the hull in the opposite direction to propeller rotation. The 'leaning' effect can be marked enough to affect directional control, or even cause instability under choppy conditions when running fast.

Torque can be compensated on a fast running hull by a wedge or transom flap; a slightly offset rudder, or tab on the rudder; or offsetting the propeller shaft to impart a compensating sidethrust. This offset can be at an angle to the centreline of the hull, or lateral displacement.



The above is summarised from a chapter in MODEL BOAT PROPELLERS published by Model and Allied Publications - a book recommended for further reading on the subject.

SELECTION GUIDE

In the case of electric motors used to power DISPLACEMENT hulls, a suitable propeller size can be determined from the WATTAGE RATING of the motor. Propellers with slightly different diameter and/or pitch can be used without appreciably affecting the performance.

MOTOR RATING watts	HULL SIZE l.o.a.	PROPELLER dia x pitch
under 5	up to 16"	1" × 1"
5	14 - 20"	1¼" × 1" or 1¼"
7.5	20 - 30"	1½" × 1½"
10	24 - 32"	1½" × 1¾" to 1¾" × 2"
15	24 - 36"	1¾" × 2¼" to 1¾" × 2½"
20	30 - 48"	2" × 2½"

General recommendations for diesels and glow motors are summarised in the following table.

ENGINE SIZE cc	(cu. in)	BOAT SPEED SLOW	MODERATE	FAST
under .5		1 × 1½	1 × 1¼	1 × ¾
.5		1¼ × 1½	1¼ × 1¾	1¼ × 1¼
.75	(049)	1¾ × 1¼	1½ × 1½	1¼ × 1½
1		1¾ × 1¼	1½ × 1½	1¼ × 1½
1.5	(.09)	1½ × 2	1½ × 2	1¼ × 1½
2.5	(.15)	1½ × 3	1½ × 1¾	1¼ × 1½
3.5		1½ × 3	1½ × 1¾	1¼ × 1½
	(.19)	1½ × 3	1½ × 1¾	1½ × 1½
	(.29)	2 × 3	1¾ × 2	1½ × 1¾
	(.35)	2½ × 3	2½ × 2½	2¼ × 2¼
10	(.60)	3 × 2¾	2½ × 3	2½ × 2½

These sizes should only be regarded as a starting point. Experiment with different diameters to get best results, especially on fast running boats.

MARINE INSTALLATIONS

Fibreglass hulls need a little extra care in fitting out to avoid any possibility of distorting the hull. Pay particular attention to the following points:-

(i) All bulkheads, mountings, etc. should be cut from marine ply and be an easy fit.

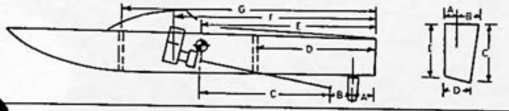
(ii) Do not use excess amounts of catalyst in the resin as this will generate heat and can distort the moulding.

(iii) When fitting bulkheads, bearers and decks etc. paint them completely with resin - this will make them fuel and water proof.

(iv) After installing rudder post, prop tube, water scoop etc. bond fibreglass mat and resin to give strength and ensure a waterproof bond.

SETTING OUT

Setting out dimensions need working out carefully. For example, the engine has to be in the right position to line up with the sterntube. There will also be an optimum position for the rudder on high-speed powerboats. Full setting out dimensions for some of the RIPMAX-SHG range of hulls are given in the table below - see also Fig. 1.



KEY	Sportster 20	Sportster 30	Contester 25	Contester 30	Cigarette 33	Surfury 36
A	1"	2¾"	2¼"	2¾"	1¼"	1¼"
B	¾"	1¼"	2¼"	2¼"	1¼"	1¼"
C	7"	8"	7"	7"-8"	10"	12"
D	7"	10"	9"	10¼"	10"	12"
E	7"	9"	10"	12"	10½"	12"
F	12"	15"	14"	15¾"	17"	18"
G	15"	20"	18"	23"	24"	24"
Cowl	small	med/large	medium	large	med/large	med/large
Water scoop(small)	½" from prop blades either side of centre line					
Deck size ϕ	24"x12"	30"x12"	30"x12"	35"x14"	35"x12"	38"x12"
Rudder dimensions						
A	1/8"	¼"	¼"	¼"	5/16"	5/16"
B	3/8"	½"	½"	½"	9/16"	9/16"
C	1¼"	1 5/8"	1 5/8"	1 5/8"	2"	2"
D	3/8"	½"	½"	½"	¾"	¾"
E	1 3/16"	1½"	1½"	1½"	1 7/8"	1 7/8"
Ripmax equivalent	small	medium	medium	medium	med/large	med/large

ϕ For glassfibre sheet or ply 1/16" thick

Note: some dimensions may be nominal depending on weight and size of engine.

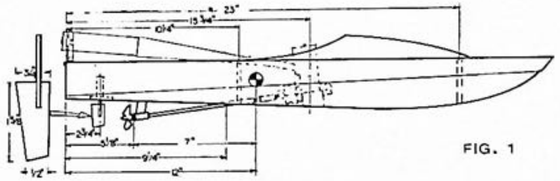


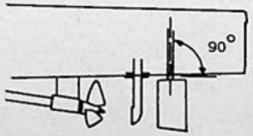
FIG. 1

The centre of gravity is most important so keep this in mind when doing your installation. Depending on the type and size of engine to be used it may be necessary to vary some of the measurements given. All the measurements stated are taken when using the largest size motor recommended for each hull.

SHAFT, TUBE AND MOTOR MOUNT

Drill a clearance size hole in the approximate area for the tube. Install a thick ply engine deck or engine mounting blocks in the engine area using a dural plate to mount the motor on. This plate can then be moved to align the engine coupling, shaft and tube assembly to the correct position. Use a rigid coupler the same length as your coupling and assemble the engine, coupler and shaft and tube. With a file elongate the tube exit hole until the shaft and engine lie in the correct position. Fasten the engine plate which will then hold the shaft and tube in the correct position.

Push plasticine in the angle between the tube and hull and around the tube slot. Working from inside the hull, fill the gap with fibreglass resin. When set lay up with 1½ oz mat and resin for additional strength. Allow this to harden, then remove the plasticine and fill any gap left with fibreglass filler. This completes the operation and the coupling can be fitted. It is recommended that a racing shaft and tube with skeg or a standard shaft and tube with a separate skeg is used.



RUDDER AND WATER SCOOP

Install the rudder post in position, sealing with fibreglass resin. Use the same procedure for the waterscoop and outlet, making sure that you produce a secure, watertight joint. Check - before the resin has set - that the rudder post is upright.

BULKHEADS

It is advisable to fit two bulkheads, one forward and one aft of the engine. The aft bulkhead is necessary to form the radio compartment and should be made completely waterproof. Fix first with fibreglass resin only. Then put a strip of 1½oz fibreglass mat around the joint and lay up with resin.

DECK AND ENGINE CANOPY

Before fixing the deck cut out the holes over the engine and radio compartments to suit the engine cowl and/or superstructure to be built. When fitting ply deck to fibreglass hull, coat hull flange with resin and fit ply deck, holding in place at close intervals with bulldog clips, strong clothes pegs, etc. and leave until set.

Finish off to size and cover the join with rubbing strip to give a neat appearance and protection. Fibreglass sheet is now available in place of ply, its main advantages are extra strength to weight ratio, waterproof, perfect finish and colours to match or contrast with your hull, easy to work with and perfectly joined with glassfibre resin, in the same manner as a ply deck. To fit the ENGINE CANOPY, remove centre carefully to marked line and sand smooth. Fit the canopy in position on the deck, using glassfibre resin.

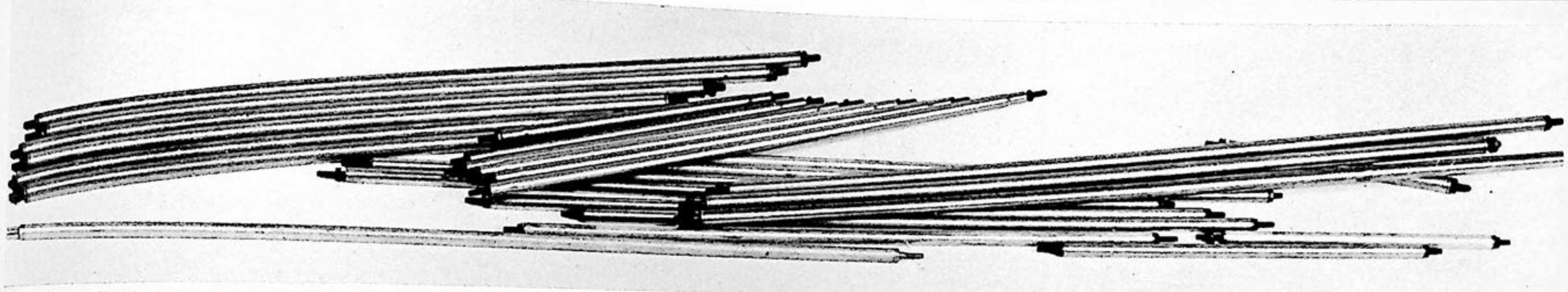
Build a suitable HATCH COVER out of ply or fibreglass sheet and make this as waterproof a fit as possible.

FINAL INSTALLATION

Fit engine and coupling, then fit the fuel tank and necessary piping for watercooling. Install the radio gear in the watertight compartment aft. Make sure that all control movements are free and easy - then you are ready to go! Happy boating!

RIPMAX

MARINE ACCESSORIES

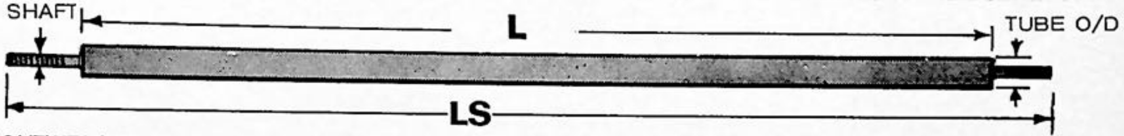


RIPMAX STANDARD SHAFTS & TUBES (4BA)

Tube (L)	Tube O/D	Shaft dia	Shaft LS	Cat no
5"	5/16"	.142"	6"	I-TD5
6"	5/16"	.142"	7"	I-TD6
6½"	5/16"	.142"	7½"	I-TD65
7"	5/16"	.142"	8"	I-TD7
8"	5/16"	.142"	9"	I-TD8
9"	5/16"	.142"	10"	I-TD9
10"	5/16"	.142"	11"	I-TD10
11"	5/16"	.142"	12"	I-TD11
12"	5/16"	.142"	13"	I-TD12
13"	5/16"	.142"	14"	I-TD13
14"	5/16"	.142"	15"	I-TD14
15"	5/16"	.142"	16"	I-TD15
16"	5/16"	.142"	17"	I-TD16
17"	5/16"	.142"	18"	I-TD17
18"	5/16"	.142"	19"	I-TD18
19"	5/16"	.142"	20"	I-TD19
20"	5/16"	.142"	21"	I-TD20

RIPMAX LIGHTWEIGHT SHAFTS & TUBES (4BA)

Tube (L)	Tube O/D	Shaft dia	Shaft LS	Cat no
6½"	5/16"	.142"	7½"	I-TE65
8"	5/16"	.142"	9"	I-TE8
9"	5/16"	.142"	10"	I-TE9
10"	5/16"	.142"	11"	I-TE10
11"	5/16"	.142"	12"	I-TE11
13"	5/16"	.142"	14"	I-TE13



LIGHTWEIGHT STERN TUBES are in anodised aluminium with swaged ends providing bearing surfaces and shaft seals. Shafts are in steel black-oxidised for corrosion resistance. Threaded 4BA each end they are intended for use with electric motors.

RIPMAX HEAVY DUTY SHAFTS & TUBES (2BA)

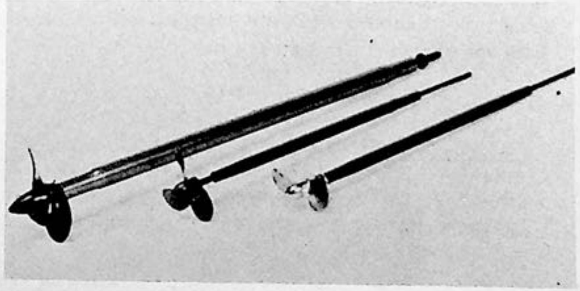
Tube (L)	Tube O/D	Shaft dia	Shaft LS	Cat no
5"	3/8"	.185"	6"	I-TG5
6"	3/8"	.185"	7"	I-TG6
7"	3/8"	.185"	8"	I-TG7
8"	3/8"	.185"	9"	I-TG8
9"	3/8"	.185"	10"	I-TG9
10"	3/8"	.185"	11"	I-TG10
11"	3/8"	.185"	12"	I-TG11
12"	3/8"	.185"	13"	I-TG12
13"	3/8"	.185"	14"	I-TG13
14"	3/8"	.185"	15"	I-TG14
15"	3/8"	.185"	16"	I-TG15
16"	3/8"	.185"	17"	I-TG16
17"	3/8"	.185"	18"	I-TG17
18"	3/8"	.185"	19"	I-TG18
19"	3/8"	.185"	20"	I-TG19
20"	3/8"	.185"	21"	I-TG20

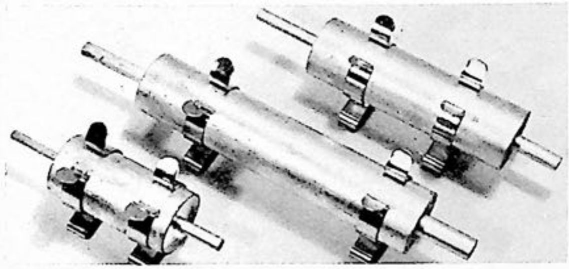
STANDARD AND HEAVY DUTY TUBES are in hard drawn brass with press-fitted sintered metal end glands/bearings. Shafts are of steel black-oxidised for corrosion resistance, with graphite-impregnated low-friction thrust washers and black nuts.

RIPMAX PROPELLER ASSEMBLIES

For smaller sizes of models RIPMAX PROPELLER ASSEMBLIES provide a simple answer, comprising aluminium tube and steel shaft, with matching prop.

I-PA0	3" tube	2mm	shaft 2-bl	7/8" prop
I-PA2	4" tube	3/32"	shaft 3-bl	1" prop
I-PA3	6" tube	3/32"	shaft 3-bl	1¼" prop
I-PA4	8" tube	4BA	shaft 3-bl	1½" prop





MARINE SILENCERS

The fitting of an efficient silencer is now an ESSENTIAL requirement before engine-powered model boats can be operated on most waters. NOT an aircraft-type silencer, but one designed specifically for marine model use.

RIPMAX MARINE SILENCERS have been specially developed for this job. They are designed on the expanding through-flow principle (with outlet bigger than inlet), ensuring absolute minimum power loss. Effective silencing is ensured by the matched expansion chamber volume, with baffle.

Constructed in heavy gauge brass throughout, with silver soldered joints, RIPMAX MARINE SILENCERS are all 1½" diameter and made in three lengths to cover engine sizes from .09 up to .80 cu.in. Inlet and outlet tubes are a matching size for telescopic fit with RIPMAX soft copper tube for simple, all-metal, plumbing in.

RIPMAX MARINE SILENCERS

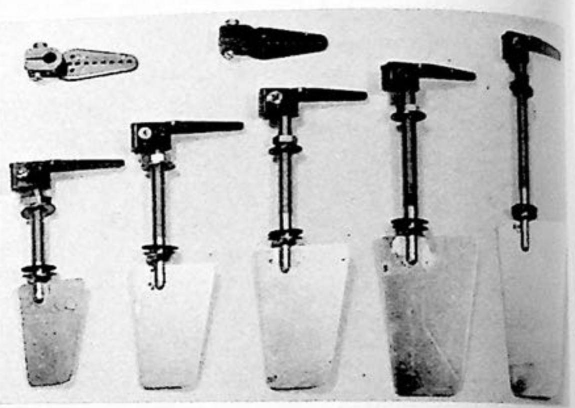
I-MA3	3"	to match .09 - .19 engines
I-MA5	5"	to match .19 - .40 engines
I-MA7	7"	to match .40 - .80 engines

MARINE RUDDERS

This is an ENTIRELY NEW RANGE of marine rudders, specially developed with radio control in mind. Blade shape is 30:70 balanced and blades themselves are stamped from SPRING BRASS for accurate reproduction - and taking knocks without bending! Rudder tube is machined from solid, with integral collar and rubber underwater seal. Rudder shaft is really solid (3/16" or 5/32" dia) hardened brass. Nylon tiller arm of special balanced design with maximum scope for adjustment.

RUDDERS

I-MA39	Junior with Rack	I-MA52	Small R/C
I-MA40	Middleweight with Rack	I-MA53	Medium R/C
I-MA43	Lightweight with Rack	I-MA54	Large R/C
I-MA51	Mini R/C	I-MA55	Ex Large R/C

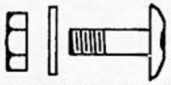


BLADE & SHAFT ONLY

I-MA51/1	Mini	I-MA52/1	Small
I-MA53/1	Medium	I-MA54/1	Large
I-MA55/1	Extra Large		

R/C TILLER ARM

I-MA51/2	5/32" bore	I-MA54/2	3/16" bore

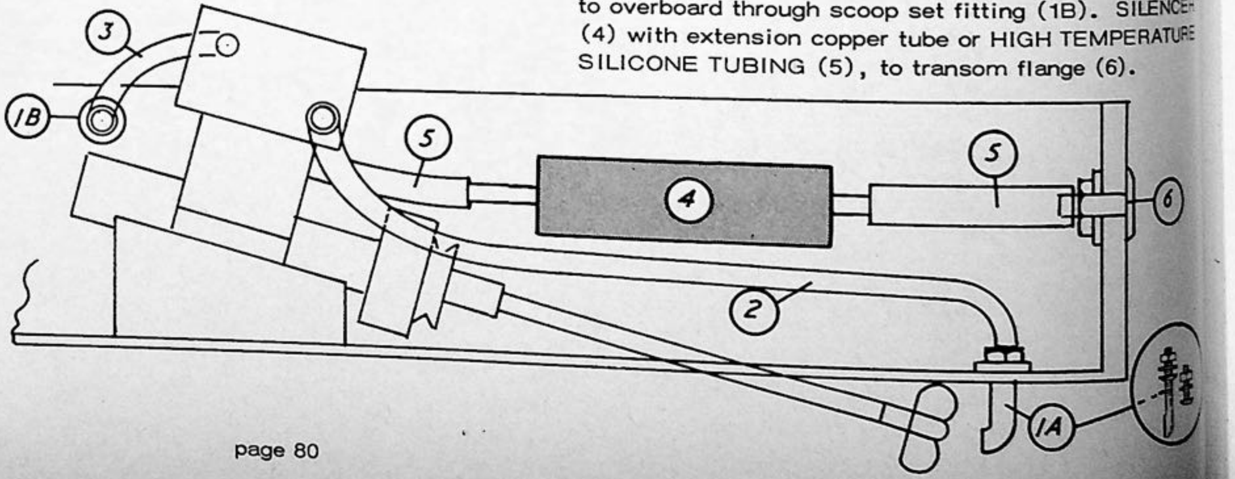


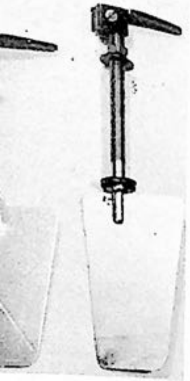
TRANSOM FLANGES Machined from solid brass with washer and nut. SMALL 3/8" o/d cat no I-MA61 MEDIUM 7/16" o/d cat no I-MA62 LARGE 5/8" o/d cat no I-MA63

SCOOP SETS Underwater scoop plus water outlet. Machined from brass with washers and nuts.
SMALL (engines up to 2.5cc) cat no I-MA71
LARGE (engines over 2.5cc) cat no I-MA72

TYPICAL INSTALLATION DETAILS

(1A) SCOOP SET with PLASTIC TUBE (2) connecting to inlet on watercooled head. Plastic tube outlet (3) to overboard through scoop set fitting (1B). SILENCER (4) with extension copper tube or HIGH TEMPERATURE SILICONE TUBING (5), to transom flange (6).

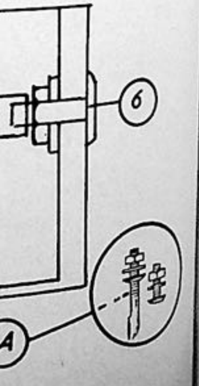




NLY
2/1 Small
4/1 Large

4/2 3/16" bore
MALL 3/8" o/d
: no I-MA63

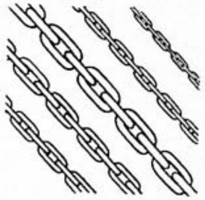
: (2) connecting
tube outlet (3)
1B). SILENCER
I TEMPERATURE
nge (6).



GENERAL MARINE ACCESSORIES

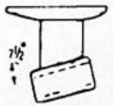
GENERAL MARINE ACCESSORIES

I-AC4	4 Links/Inch Plated Chain (pkt yd)
I-AC6	6 " " " "
I-AC8	8 " " " "
I-AC12	12 " " " "
I-AC18	18 " " " "
I-AC26	26 " " " "
I-FS1	Standard Bow Fender
I-FS2	Large Bow Fender
I-FS3	Side Fenders (pkt 4)
I-FS5	Fender Set (1 Bow & 2 Side)
I-S18	Deck Winch
I-S580	Small Screw Eye (3/32" I.D.)
I-S581	Large " " (5/32" I.D.)
I-S585	Shroud Hooks
I-BS1	Small Skeg (TE & TD Tubes)
I-BS2	Large Skeg (TG Tubes)

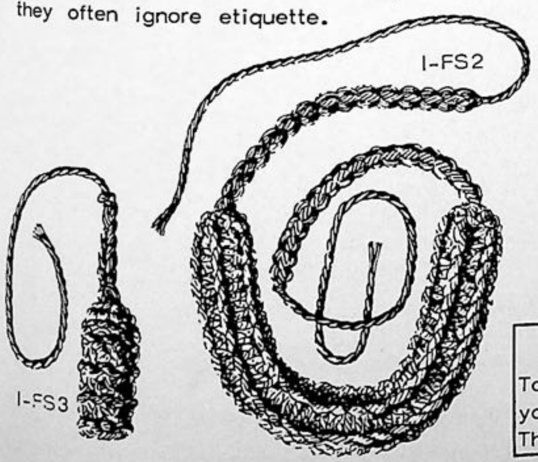


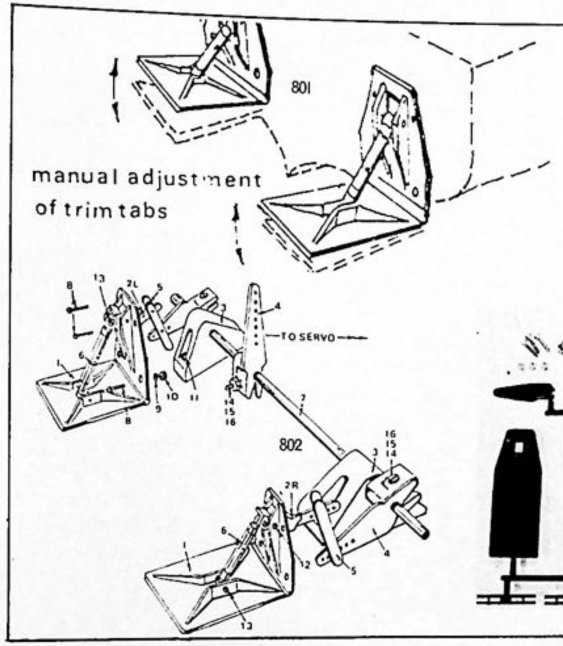
FENDERS - A MATTER OF ETIQUETTE

Fenders should never be worn - i.e. left slung over the side - when a craft is under way and clear of the dock. To run with fenders hanging is a sign of an amateur skipper! Workboats are the exception - they often ignore etiquette.



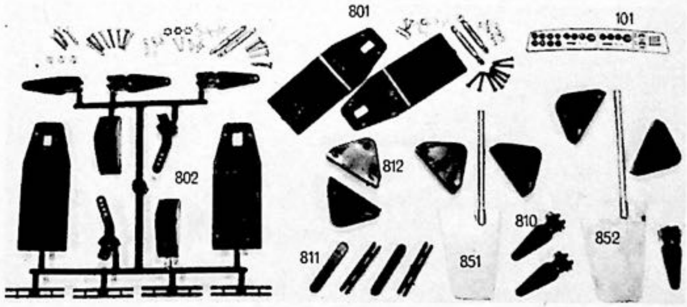
I-BS1/2





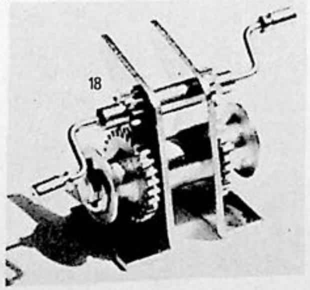
"SHG MARINE ACCESSORIES"

Trim tabs can make an amazing difference to the performance of a high speed hull. 'SHG' produce two versions, with main parts moulded in high-strength plastic - either for manual adjustment or full 'working' trim tabs operated by an R/C servo. Tabs independently adjustable (manually) for heel trim, and continuously adjustable when running for fore-and-aft trim.



Other 'SHG' accessories are shown in this group picture which have been specially developed by model powerboat experts to fill a definite need - and are not available elsewhere. Like the transom mounted rudders, for example. And for an added touch of realism on any powerboat model, the cockpit instrument set is superb!

I-SHG101	Cockpit Instrument Set
I-SHG801	Manual Trim Tab (set)
I-SHG802	R/C " " (set)
I-SHG810	3/16" Tiller Arm
I-SHG811	Double Ended Quick Link (pkt 4)
I-SHG812	3/16" Bearing Block (pkt 2)
I-SHG851	Large Transom Mounted Rudder
I-SHG852	Extra Large Transom Mounted Rudder



I-S18 DECK WINCH

A magnificent working fitting, size 13/16" x 5/8", height 7/8". Geared 2¼ : 1.

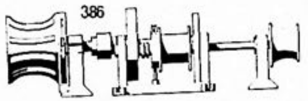
Just one example of the superb realism and authenticity in all the RIPMAX range.

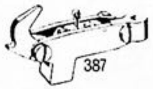
THE SHIP MODELLER'S CHANDLERY!

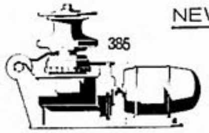
To decide on just the right type and size of fitting to suit your particular need, you should visit your local model shop. There's bound to be something in the RIPMAX range to suit.

GRAUPNER MARINE ACCESSORIES

RIPMAX

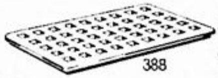




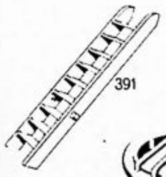


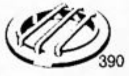
NEW GRAUPNER FITTINGS

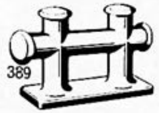
Specially made for the BUGSIER but also available separately. These are superb scale fittings.

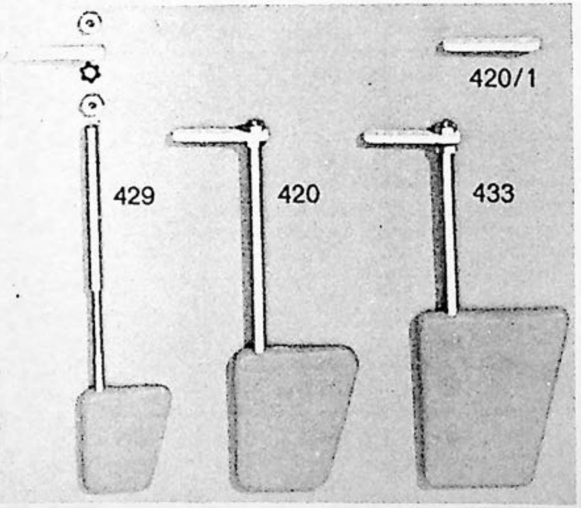


J-G385	Anchor Winch
J-G386	Tug Winch
J-G387	Towing Hook
J-G388	Grating
J-G389	Bar Bollard
J-G390	Barred Porthole 8mm
J-G391	75mm Companionway



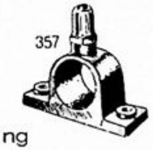




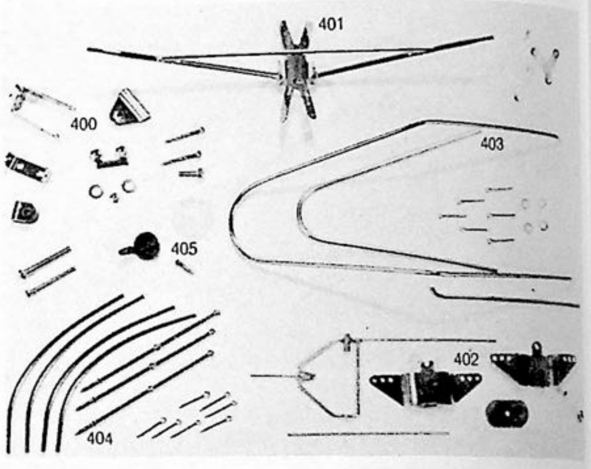


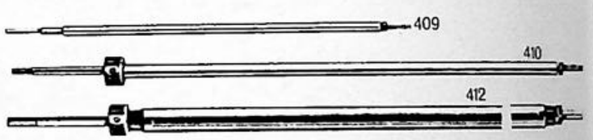
GRAUPNER Marine Accessories are of the finest quality... DESIGNED as functional, working fittings that are right for the job... ENGINEERED to last a lifetime.

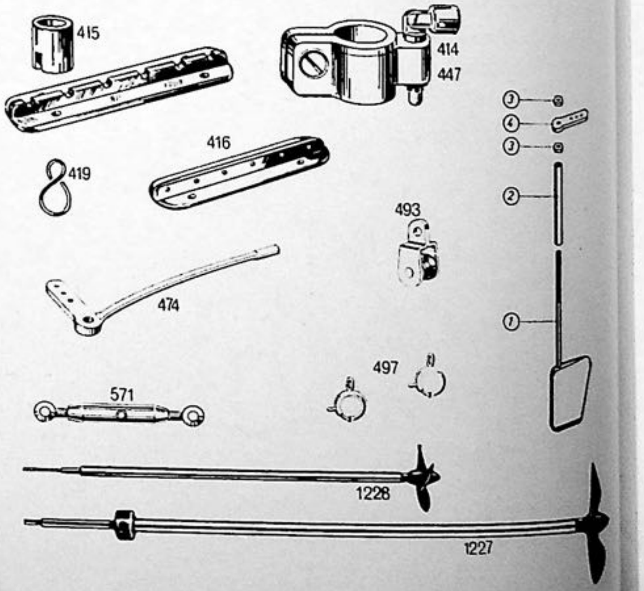
The following list includes a wide range of essential model yacht fittings...also a selection of Graupner shafts and tubes for powered boats.

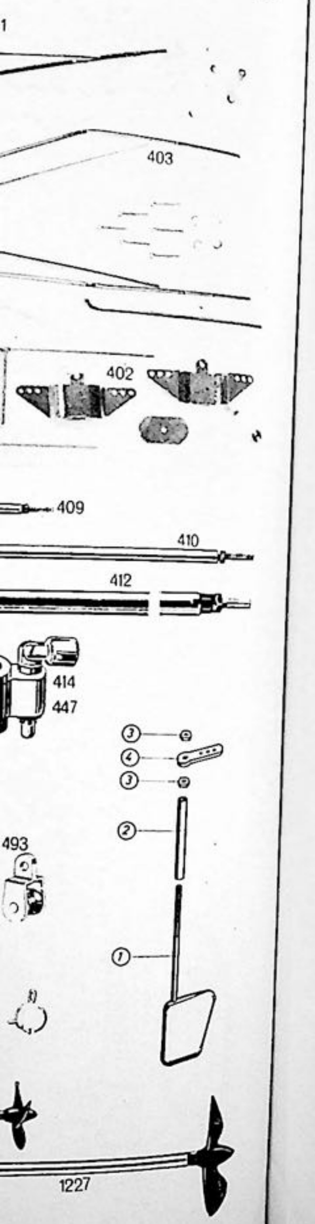


I-G357/1	4mm Bearing Block (pkt 10)	
I-G357/2	6mm " " "	
I-G400	Main Boom Bearing	
I-G401	Upper Shroud Spreader	
I-G402	Mast Top with Pennant Bearing	
I-G403	Pulpit Rail	
I-G404	Stern Rail	
I-G405	Yard Arm End	
I-G409	4¾" Stern Tube & Shaft	2mm to M2
I-G410	5¾" " " " "	3 & 4mm to M4
I-G411	7" " " " "	3 & 4mm to M4
I-G412	8½" " " " "	3 & 4mm to M4
I-G413	2" " " " "	2mm to M2
I-G414	8mm Main Boom Bearing	
I-G447	12mm " " "	
I-G415	Adjustable Mast Step (pkt 10)	
I-G416	Jib Rack (pkt 10)	
I-G419	Shroud Hooks (pkt 10)	
I-G420/1	Rudder arm only (pkt 10)	
I-G420	Medium R/C Rudder	
I-G429	Small " "	
I-G433	Large " "	
I-G474	Rudder Arm with Tiller Bar (pkt 10)	
I-G493	Single Roller Block (pkt 10)	
I-G497	Stay Rider (pkt 20)	
I-G571/1	10mm Brass Turnbuckle (pkt 10)	
I-G571/2	17mm " " "	
I-G1227	50mm (2") 3-Bl Propeller Assembly	
I-G1228	30mm (1 1/8") 3-Bl Propeller Assembly	
I-G1230	40mm (1 1/2") " " "	



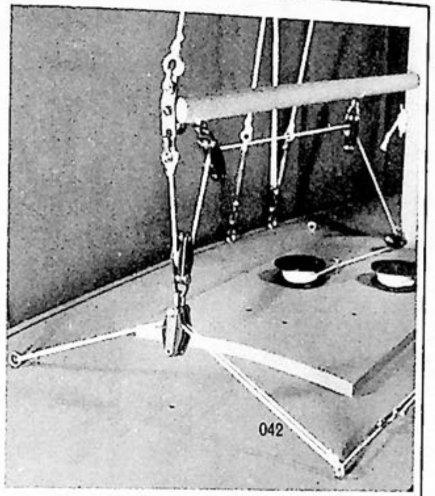


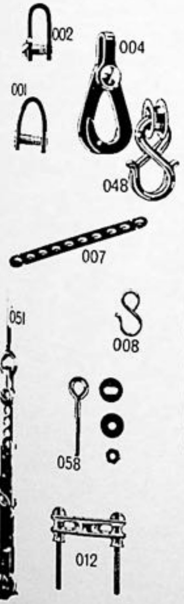




"PEKABE" YACHT FITTINGS

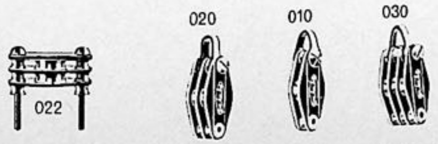
SUPER-DE-LUXE... Without a doubt !! Brass and laminated plastic ('Pertinax') where appropriate. BLOCKS have BALL RACES and shafts of stainless steel. 17 parts in single block! 28 parts in double block! 41 parts in triple block!



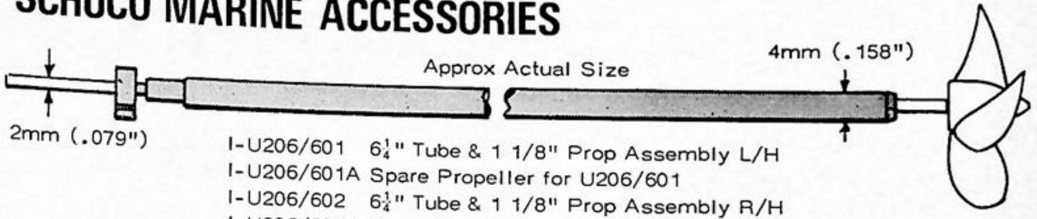


PEKABE MARINE ACCESSORIES

I-PK001	Shackle with 5mm Bolt (pkt 2)
I-PK002	" " 3mm " (pkt 2)
I-PK004	Double Hook with Shackle
I-PK007	Universal Punched Strip (pkt 4)
I-PK008	Shroud Hook (pkt 10)
I-PK010	Single Block with Shackle
I-PK012	" " with Deck Fixing
I-PK020	Double Block with Shackle
I-PK022	" " with Deck Fixing
I-PK030	Triple Block with Shackle
I-PK042	Braided Nylon Rigging Cord (20M)
I-PK047	Rigging Eyelet (pkt 10)
I-PK048	Double Shroud Hook & Eyelet (pkt 4)
I-PK051	Adjustable Shroud Hook
I-PK058	Eyebolt with Deckplate (pkt 2)

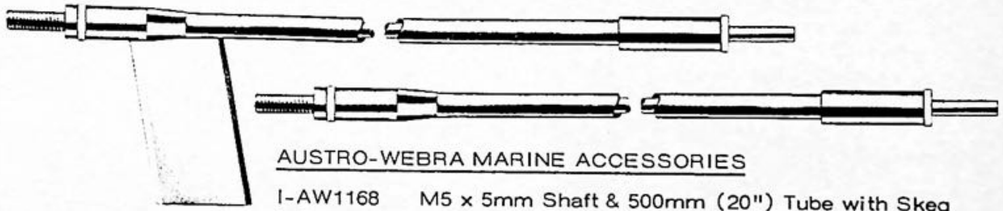


SCHUCO MARINE ACCESSORIES



I-U206/601	6¼" Tube & 1 1/8" Prop Assembly L/H
I-U206/601A	Spare Propeller for U206/601
I-U206/602	6¼" Tube & 1 1/8" Prop Assembly R/H
I-U206/602A	Spare Propeller for U206/602

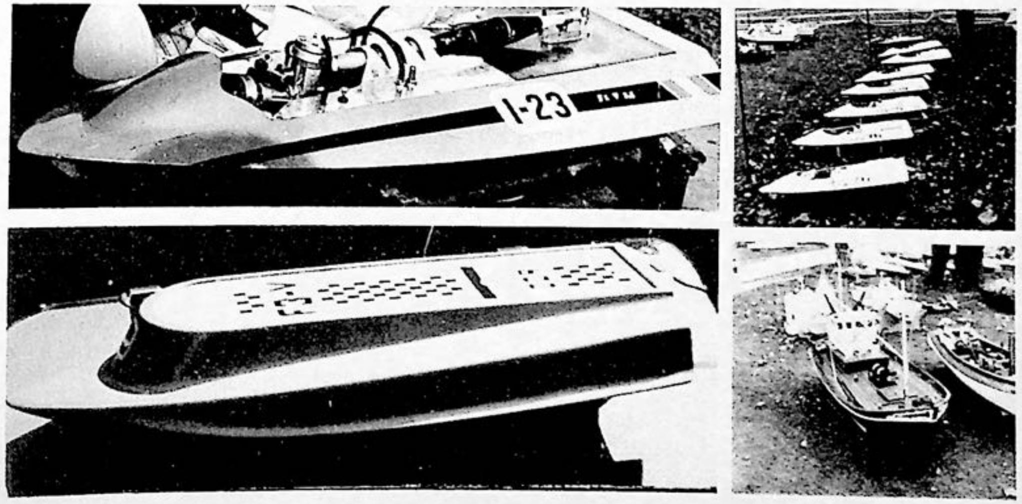
AUSTRO-WEBRA MARINE ACCESSORIES



AUSTRO-WEBRA MARINE ACCESSORIES

I-AW1168	M5 x 5mm Shaft & 500mm (20") Tube with Skeg
I-AW1169	M5 x 5mm Shaft & 500mm (20") Tube without Skeg
K-AW1159/4	¼ UNF Thread to 5mm Coupling (see Couplings page)

"PIT SCENE"

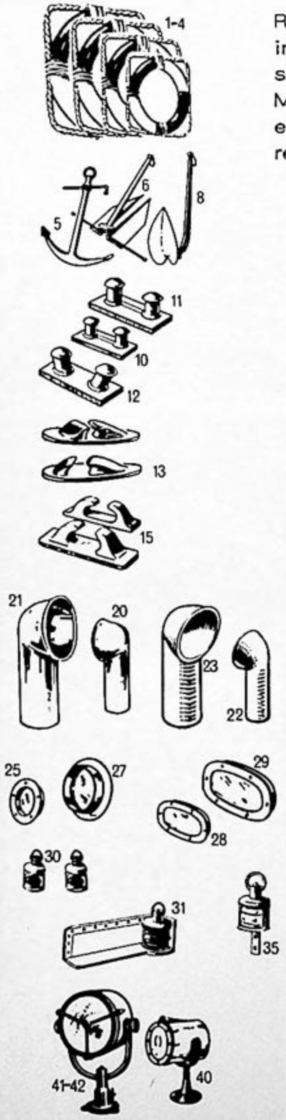


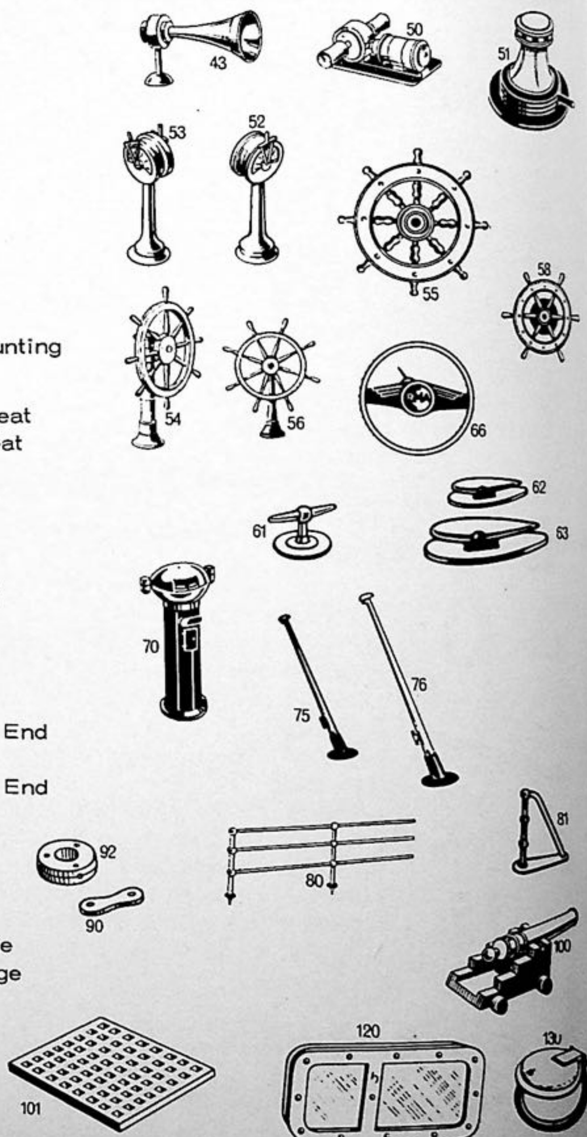
RIPMAX
PLASTIC SHIPS' FITTINGS

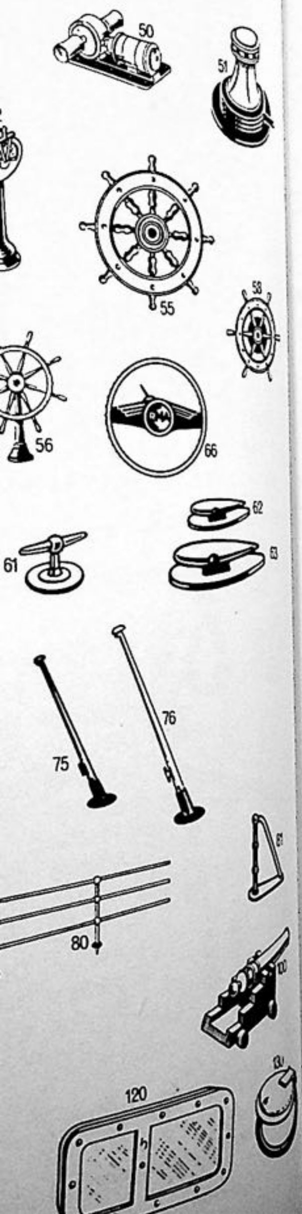
RIPMAX

Realistic true-to-scale fittings, fully authentic in pattern, detail and appearance. Finished in self-colour plastic, hand-painted where applicable. Movable parts on anchors, telegraphs, wheels, etc.. A range that covers all your fitting requirements for any craft.

J-P1	¾" Lifebuoy
J-P2	1" Lifebuoy
J-P3	1 3/8" Lifebuoy
J-P4	2" Lifebuoy
J-P5	Stock Anchor
J-P6	Small Danforth Anchor
J-P7	Large Danforth Anchor
J-P8	Small C.Q.R. Anchor
J-P9	Large C.Q.R. Anchor
J-P10	Small Bollard
J-P11	Large Bollard
J-P12	Staggered Bollard
J-P13	Small Angled Fairleads (L&R pair)
J-P14	Large Angled Fairleads (L&R pair)
J-P15	Large Straight Fairleads
J-P16	Small Straight Fairleads
J-P20	Small Grey Vent
J-P21	Large Grey Vent
J-P22	Small Cream Vent
J-P23	Large Cream Vent
J-P25	¼" Portlight
J-P26	3/8" Portlight
J-P27	½" Portlight
J-P28	Small Oval Portlight
J-P29	Large Oval Portlight
J-P30	Sidelights only (L & R pair)
J-P31	Sidelights on Boards (L & R pair)
J-P35	Masthead Light
J-P40	Small Searchlight
J-P41	Large White Searchlight
J-P42	Large Grey Searchlight
J-P43	Klaxon Horn
J-P50	Electric Winch
J-P51	Steam Capstan
J-P52	Single Telegraph
J-P53	Double Telegraph
J-P54	Large Wheel on Stand
J-P55	Large Wheel only
J-P56	Small Wheel on Stand
J-P58	Wheel on Bulkhead Mounting
J-P61	Mooring Cleat
J-P62	Small Torpedo Eyed Cleat
J-P63	Large Torpedo Eyed Cleat
J-P65	Small Launch Wheel
J-P66	Medium Launch Wheel
J-P67	Large Launch Wheel
J-P70	Binnacle (non working)
J-P75	Small Jackstaff
J-P76	Large Jackstaff
J-P80	Large Staunchion Rail
J-P81	Large Staunchion Rail End
J-P82	Small Staunchion Rail
J-P83	Small Staunchion Rail End
J-P90	Small Bowsie (doz)
J-P91	Large Bowsie (doz)
J-P92	Ring Bowsie
J-PG99	Large Cannon & Carriage
J-PG100	Small Cannon & Carriage
J-PG101	Small Grating
J-PG102	Large Grating
J-P120	Launch Window
J-P130	Hinged Hatch Cover

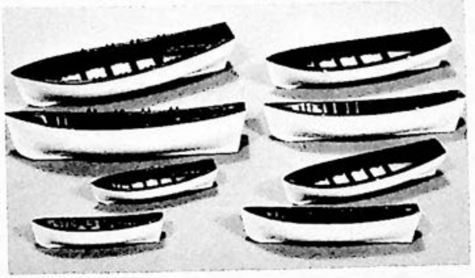






RIPMAX CHROMED AND PAINTED "de luxe" SHIPS' FITTINGS

Fittings used on modern full size yachts, motor cruisers, runabouts, etc. are very often highly polished or chrome plated . This range of de luxe fittings offers that extra realism for models. Fittings are the same as in the Ripmax Plastic Ship Fittings range, but finished with a mirror-bright metallic coating, resistant to corrosion. Where necessary individual fittings are also hand painted.

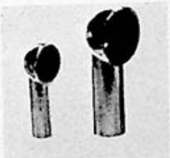


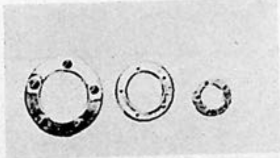
Save the many hours necessary for making scale lifeboats from scratch ! These realistic mouldings are ready for painting. In four sizes. Colour white/brown.

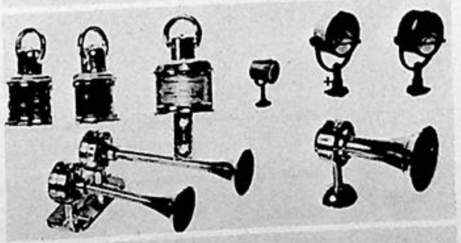
RIPMAX PLASTIC LIFEBOATS

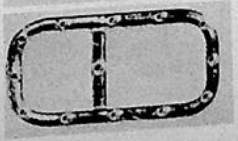
J-RA51	Small	(1 7/8")
J-RA52	Medium	(2 1/2")
J-RA53	Large	(3 1/8")
J-RA54	Extra Large	(3 3/4")

J-CF510	Small Bollard
J-CF511	Large Bollard
J-CF513	Small Angled Fairleads (L & R pair)
J-CF514	Large Angled Fairleads (L & R pair)
J-CF515	Large Straight Fairleads
J-CF516	Small Straight Fairleads
J-CF520	Small Vent
J-CF521	Large Vent
J-CF525	1/4" Portlight
J-CF526	3/8" Portlight
J-CF527	1/2" Portlight
J-CF530	Sidelights only (pr)
J-CF535	Masthead light
J-CF540	Small Searchlight
J-CF541	Large Searchlight
J-CF543	Klaxon Horn
J-CF547	Twin Tone Horn
J-CF555	Large Wheel only
J-CF561	Mooring Cleat
J-CF562	Small Torpedo Eyed Cleat
J-CF563	Large Torpedo Eyed Cleat
J-CF620	Launch Window



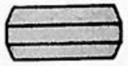


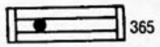


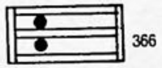


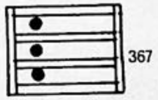
GRAUPNER WOODEN SAILINGSHIP FITTINGS

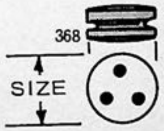
	SINGLE BLOCK
J-G365/1	3mm
J-G365/2	5mm
J-G365/3	7mm
J-G365/4	10mm
	DOUBLE BLOCK
J-G366/1	3mm
J-G366/2	5mm
J-G366/3	7mm
	TRIPLE BLOCK
J-G367/1	3mm
J-G367/2	5mm
J-G367/3	7mm
	3-HOLE DEAD EYE
J-G368/1	2mm
J-G368/2	3mm
J-G368/3	5mm
J-G368/4	7mm
J-G368/5	10mm
	BALUSTRADE POST
J-G369/1	6mm
J-G369/2	8mm
J-G369/3	10mm
J-G369/5	14mm
J-G369/6	16mm
J-G370/4	12mm (double bulge)
J-G371	Belaying Pin
J-G1131	Cording Roller

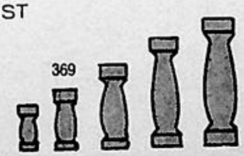


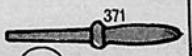


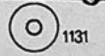




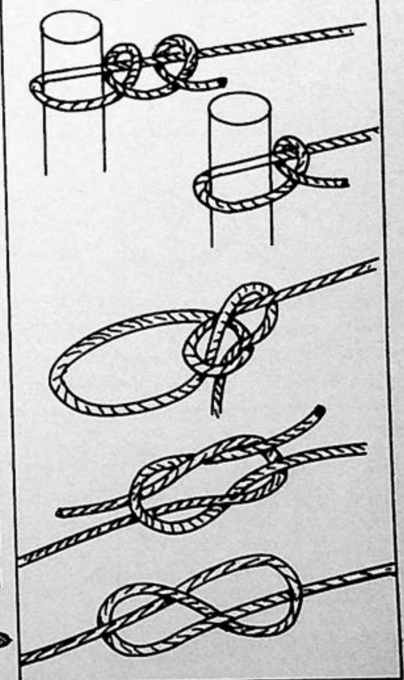








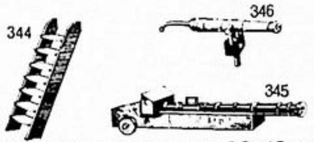
USEFUL KNOTS



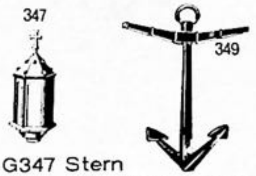
GRAUPNER SHIPS' FITTINGS

RIPMAX

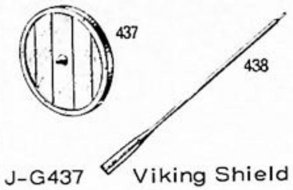
Belaying Pin 13mm
J-G319. Fiddle Block
9 x 5mm J-G320.
4mm Block with
single hole J-G329.



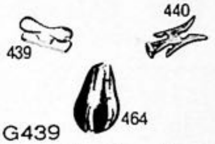
J-G344 Companionway 36x10mm
J-G345 Breech Gun 42mm (1/64 Scale)
J-G346 Swivelling Cannon 23mm



J-G347 Stern Lantern 20mm (1/64th scale)
J-G349 Admiralty Anchor 50mm

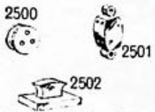


J-G437 Viking Shield 20mm
J-G438 Viking Oar 84mm

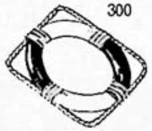


J-G439 10mm Rigging Support.
J-G440 6mm Viking Cleat.
J-G464 10mm Pear Block (3 holes).

J-G465 6mm Block with Double Hole
J-G466 9 x 9mm Gun Port (movable lid)
J-G467 13 x 12mm Gun Port (movable lid)



J-G2500 3-hole Dead Eye 5mm
J-G2501 10mm Block with eyelets
J-G2502 Galleon Cleat 10mm



LIFEBUOYS
J-G300/0 9mm
J-G300/1 19mm
J-G300/2 25mm
J-G300/3 35mm

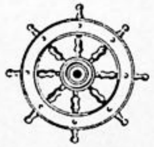
J-G301/0 8 x 3mm Bollard
J-G301/1 16 x 6mm Bollard
J-G301/2 18 x 7mm Bollard
BRASS FINISH
J-G301/0G 8 x 3 mm Bollard
J-G301/1G 16 x 6mm Bollard
J-G301/2G 18 x 7mm Bollard

J-G303/0 Fairlead 7 x 3mm
J-G303/3 Fairlead 13 x 2.5mm

SELF COLOUR COWL VENT		BRASS FINISH COWL VENT	
J-G304/0	12mm	J-G304/0G	12mm
J-G304/1	22mm	J-G304/1G	22mm
J-G304/2	35mm	J-G304/2G	35mm

PORTHOLES		BRASS FINISH	
J-G305/1	7mm	J-G305/1G	7mm
J-G305/2	10mm	J-G305/2G	10mm
J-G305/3	12mm	J-G305/3G	12mm

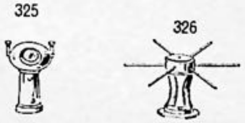
FOGHORNS
J-G311 25 x 18mm
J-G311S 25 x 18mm (silver finish)



SHIP'S WHEEL		BRASS FINISH	
J-G314/1	14mm	J-G314/1G	14mm
J-G314/2	20mm	J-G314/2G	20mm

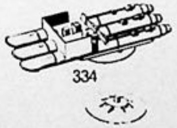
Self Colour and Brass Finish

J-G322 Pulley Block 8x34mm
J-G323 36x18mm Cylindrical Life Raft
J-G324/0 12mm Venturi Vent
J-G324/1 22mm " "
J-G324/2 35mm " "
BRASS FINISH
J-G324/0G 12mm Venturi Vent
J-G324/1G 22mm " "
J-G324/2G 35mm " "

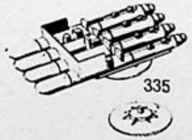


J-G325 12mm Binnacle
J-G325G 12mm Binnacle (brass finish)
J-G326 10mm Capstan

J-G328 Plastic Lifeboat with chocks. 50mm long.



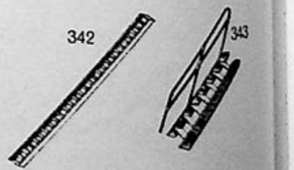
J-G334 Triple Torpedo Battery 36 x 11mm



J-G335 Quadruple Torpedo Battery 36 x 14mm

Stock Anchors (Black)
J-G336/1 23mm
J-G336/2 35mm

Hall Anchors
J-G341/1 18mm
J-G341/2 27mm
J-G341/3 55mm



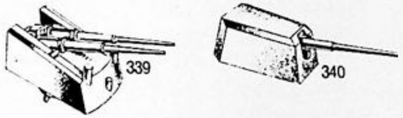
J-G342 60mm Companionway
J-G343 18mm Companionway

RIPMAX

GRAUPNER SHIPS' FITTINGS

J-G337 Single A.A.Gun 10mm

J-G338 Twin A.A.Gun 11mm

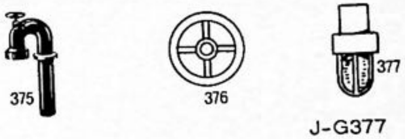


J-G339 Twin Heavy A.A.Gun 12mm

J-G340 Gun with Shield 11mm

J-G373 Mast Head Lamp 24mm

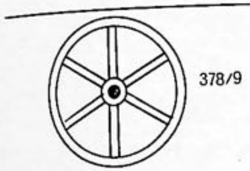
J-G374 Bar Bollard 28mm



J-G375 Goose Neck Valve 33mm

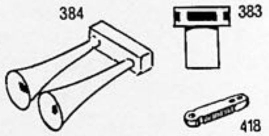
J-G376 Hand Wheel 9mm

J-G377 Waterproofed Lamp 7.5 x 4mm

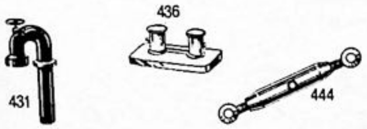


J-G378 38mm Steering Wheel (Grey)
J-G379 18mm Steering Wheel (Grey)

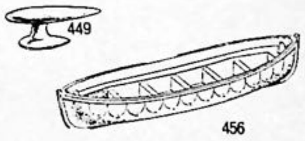
J-G380 Deck Lamp 6 x 6mm
J-G381 360° Lamp 11 x 6mm
J-G382 Morse Lamp 8 x 6mm



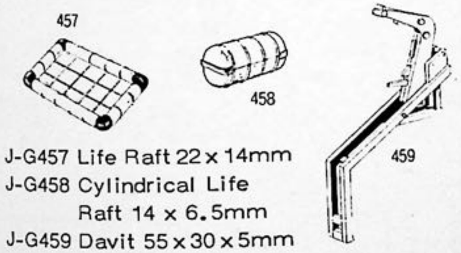
J-G383 Siren 9 x 7mm
J-G384 Dual Siren 20mm
J-G418 Bowsie



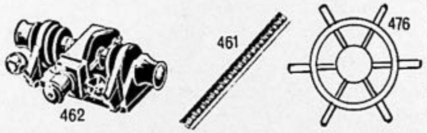
J-G431 24mm Goose Neck Valve
J-G436 14mm Bar Bollard
J-G444 16mm Turnbuckle (non-adjustable)



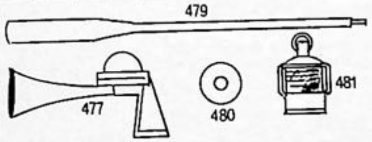
J-G449 Torpedo Cleat 14mm
J-G456 Life Boat 86mm



J-G457 Life Raft 22 x 14mm
J-G458 Cylindrical Life Raft 14 x 6.5mm
J-G459 Davit 55 x 30 x 5mm



J-G461 Companionway 34 x 8mm
J-G462 Windlass 34 x 25 x 12mm
J-G476 Steering Wheel (White) 25mm



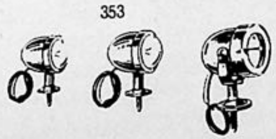
J-G477 Signal Horn 29 x 19mm
J-G479 Oar 70mm
J-G480 Pulley 8mm
J-G481 Ship's Lamp 21mm

J-G483 32mm Steering Wheel (Black)
J-G495 24mm Belaying Cleat
J-G1129/1 Stock Anchor (metallic) 20mm
J-G1129/3 Stock Anchor (metallic) 40mm

351 WORKING LAMPS 352/1 & /2

J-G351 Interior Light 12mm

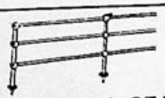
J-G352/1 12mm Navigation Lamps (pr)
J-G352/2 23mm Navigation Lamps (pr)



J-G353/1 9mm Searchlight
J-G353/2 12mm "
J-G353/3 14mm "

FLAGS

J-G360 West German
J-G361 Swiss
J-G362 British
J-G363 United States



DOUBLE BALL STANCHIONS
J-G450/1 10mm J-G450/2 15mm
J-G450/3 25mm J-G450/4 33mm
J-G468 Railing Section Complete 12 x 238mm
J-G482 12mm Single Ball Stanchion
J-G491 50mm Double Ball Stanchion
J-G496 Elastic Stanchion Rail 0.8mm

J-G1466/1 6mm Brass Porthole
J-G1466/2 8mm Brass Porthole

METAL AND MISCELLANEOUS

RIPMAX-HUCO DE LUXE COUPLINGS

COUPLINGS

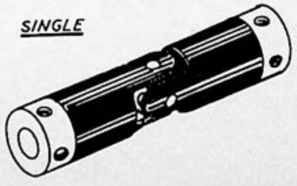
HUCO DE-LUXE COUPLINGS are precision moulded from high-stability nylon with 2 pivots. Single couplings can be used to transmit power through angles up to 37½°. Single couplings can be modified to DOUBLE couplings by fitting an appropriate CONVERTER. DOUBLE COUPLINGS are a preferred choice for all I/C engine drives.

As a general guide, most foreign engines have a ¼" UNF shaft thread. For motors up to .40 (6.5cc) use coupling C83 to 4BA and C93 to 2BA. For larger engines use double coupling C103 to 2BA.

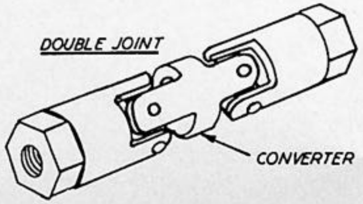
ELECTRIC MOTORS	Motor Shaft	Coupling to 3/32"	Coupling to 4BA	Double Converter
RIPMAX				
ORBIT				
005,105,205	2mm	C14	C24	CDS
305,405,505	2.3mm	C15	C25	CDS
605	2.3mm	C15	C24	CDS
705	1/8"	C12	C22	CDS
805	4mm	C42	C52	CDM
ATOM	2mm	C14	C24	CDS
MARX				
LUDER				
Microperms	1.5mm	C13	-	CDS
Milliperms	1.5mm	C13	-	CDS
Monoperms	2mm	C14	C24	CDS
Decaperms	4mm	C42	C52	CDM
Hectoperms	4mm	C42	C52	CDM
Richards	4mm	C42	C52	CDM
Mini Richards	2mm	C14	C24	CDS
Pile Gears	4mm	C42	C52	CDM
GRAUPNER				
TO3,TO5	2mm	C14	C24	CDS
TAYCOL				
Target	3/32"	C11	C21	CDS
Meteor	3/32"	C11	C21	CDS
Standard	3/16"	-	C51	CDM
S/Marine	1/4"	C91 to 2BA	C81	CDL
Double S/S	1/4"		C81	CDL

ENGINE	Shaft Thread	Coupling to 4BA	Coupling to 2BA	Double Converter
AUSTRO WEBRA				
20	6x1mm	C84	-	CDL
61F & R	¼ UNF	-	C103	-
D.C.				
Dart	4BA	C53	C55	CDM
Merlin	3BA	C54	-	CDM
Spitfire	2BA	C55	C65	CDM
Sabre	2BA	C55	C65	CDM
Rapier	1BA	C56	C66	CDM
ENYA				
09	5x.9mm	C57	-	CDM
15 & 19	6x1mm	C84	-	CDL
29 & 35	7x1mm	-	C105	-
29BB & 35BB	¼ UNF	C83	C93	CDL
45BB & 60	7x1mm	-	C105	-
H.P.				
40F & R	6x1mm	C84	-	CDL
61F & R	¼ UNF	-	C103	-
MERCO				
29 & 35	¼ BSF	C82	C92	CDL
49 & 61	¼ UNF	-	C103	-
M.E.				
Heron 1.0cc	2BA	C55	C65	CDM
Snipe 1.5cc	2BA	C55	C65	CDM

SINGLE



DOUBLE JOINT



RIPMAX-HUCO DELUXE COUPLINGS

SMALL SINGLE COUPLINGS

K-C11	3/32" (.094") to 3/32" (.094")
K-C12	1/8 " (.125") to 3/32" (.094")
K-C13	1.5mm(.059") to 3/32" (.094")
K-C14	2.0mm(.080") to 3/32" (.094")
K-C15	2.3mm(.091") to 3/32" (.094")
K-C21	3/32" (.094") to 4BA Thread
K-C22	1/8 " (.125") to 4BA Thread
K-C24	2.0mm(.080") to 4BA Thread
K-C25	2.3mm(.091") to 4BA Thread
K-CDS	Small Double Converter

MEDIUM SINGLE COUPLINGS

K-C42	4.0mm(.157") to 3/32" (.094")
K-C51	3/16" (.188") to 4BA Thread
K-C52	4.0mm(.157") to 4BA Thread
K-C53	4BA Thread to 4BA Thread
K-C54	3BA Thread to 4BA Thread
K-C55	2BA Thread to 4BA Thread
K-C56	1BA Thread to 4BA Thread
K-C57	5 x 0.9mm Thread to 4BA Thread
K-C65	2BA Thread to 2BA Thread
K-C66	1BA Thread to 2BA Thread
K-CDM	Medium Double Converter
K-CDMM	Medium Double Converter (Modified)

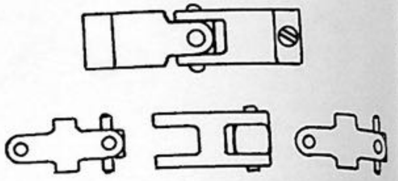
LARGE SINGLE COUPLINGS

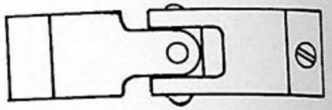
K-C81	1/4 " (.250") to 4BA Thread
K-C82	1/4BSF Thread to 4BA Thread
K-C83	1/4UNF Thread to 4BA Thread
K-C84	6 x 1mm Thread to 4BA Thread
K-C91	1/4 " (.250") to 2BA Thread
K-C92	1/4BSF Thread to 2BA Thread
K-C93	1/4UNF Thread to 2BA Thread
K-C94	6 x 1mm Thread to 2BA Thread
K-CDL	Large Double Converter

GIANT DOUBLE COUPLING

K-C103	1/4UNF Thread to 2BA Thread
K-C105	7 x 1mm Thread to 2BA Thread
K-C107	5/16UNF Thread to 2BA Thread

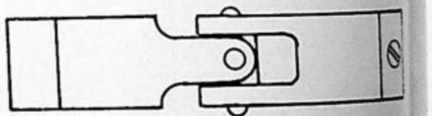
SMALL



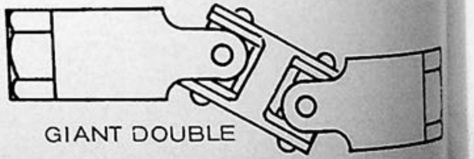


MEDIUM

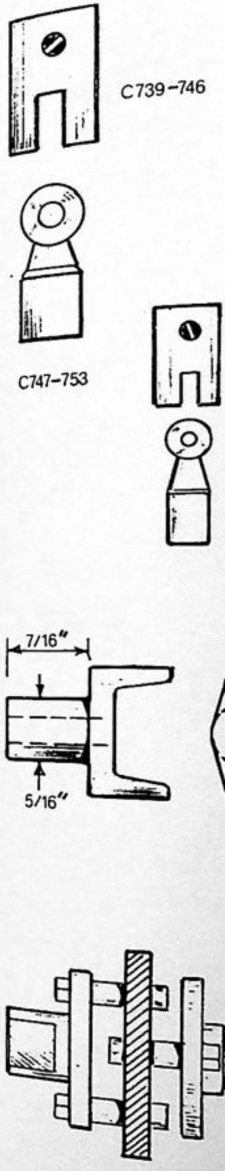
Note - MEDIUM SIZE COUPLINGS are produced in two similar designs - 'ORIGINAL' and 'MODIFIED'. Care must be taken to fit the correct converter when making into a double coupling. To distinguish between the two types, if 'HUCO' is embossed on a plain background, it is an 'ORIGINAL' type and requires a CDM CONVERTER. If 'HUCO' is embossed inside an oval recess, it is a 'MODIFIED' type and requires a CDMM CONVERTER.



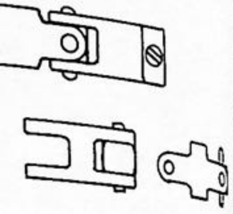
LARGE

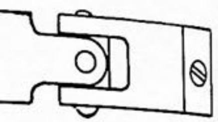


GIANT DOUBLE



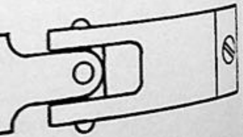
SMALL



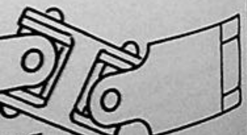


MEDIUM

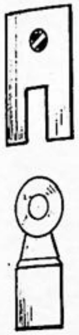
DIUM SIZE COUPLINGS ed in two similar designs- L' and 'MODIFIED'. Care aken to fit the correct vhen making into a double To distinguish between the , if 'HUCO' is embossed n background, it is an L' type and requires a NVERTER. If 'HUCO' is inside an oval recess, it DIFIED' type and requires CONVERTER.

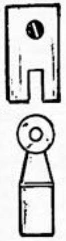


LARGE



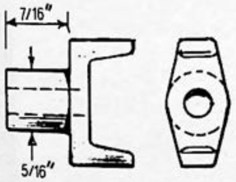
BLE





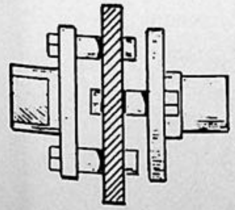
RIPMAX STEEL BALL COUPLINGS

	LARGE CASE-HARDENED
K-C739	1BA thread to 2BA thread
K-C740	3BA thread to 4BA thread
K-C741	4BA thread to 4BA thread
K-C742	2BA thread to 4BA thread
K-C743	2BA thread to 2BA thread
K-C744	¼BSF thread to 4BA thread
K-C745	¼BSF thread to 2BA thread
K-C746	1BA thread to 4BA thread
	SMALL UNHARDENED
K-C747	2.8mm (.111") to 4BA thread
K-C748	3/32" (.094") to 3/32" (.094")
K-C749	3/32" (.094") to 4BA thread
K-C750	¼" (.250") to 4BA thread
K-C751	3/16" (.188") to 4BA thread
K-C752	2.0mm (.080") to 4BA thread
K-C753	4.0mm (.157") to 4BA thread



RIPMAX NYLON PIN COUPLINGS

K-C755	1.5mm (.059") to 3/32" (.094")
K-C756	2.0mm (.080") to 3/32" (.094")
K-C757	2.3mm (.091") to 3/32" (.094")
K-C766	2.0mm (.080") to 4BA thread
K-C767	2.3mm (.091") to 4BA thread



RIPMAX FLEXIDISC COUPLINGS

K-C156	¼BSF thread	to	4BA thread
K-C157	2BA thread	to	4BA thread
K-C158	1BA thread	to	4BA thread
K-C159	¼UNF thread	to	4BA thread
K-C160	¼UNF thread	to	2BA thread
K-C161	¼BSF thread	to	2BA thread
K-C170	6 x 1mm thread	to	4BA thread
K-C171	7 x 1mm thread	to	4BA thread
K-C176	7 x 1mm thread	to	2BA thread

TYPES OF COUPLINGS

• • • NYLON PIN COUPLINGS are light, non-corrodible, and suitable for lower power electric motors. Each half is a push-fit onto its shaft and the coupling will drive even when badly misaligned. RIPMAX NYLON PIN COUPLINGS suit ORBIT 005 - 605 and all MONOPERMS.

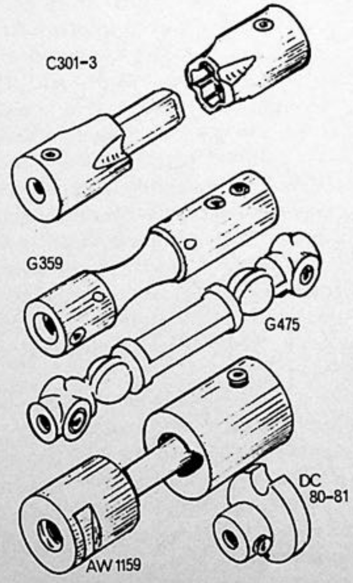
• • • GRAUPNER K-G475 is a Carden-type coupling of plastic construction that accepts some misalignment. It suits MONOPERMS, HECTOPERM and DECAPERM motors.

• • • GRAUPNER G-359 COUPLINGS have a semi-rigid nylon connector - use with MONOPERM motors where a straight alignment can be provided.

• • • RIPMAX STEEL BALL COUPLINGS come in two sizes - SMALL for electric motors and LARGE (case-hardened) for diesels and glow motors. Being made of metal they will accept a lot of punishment. FLEXIDISC COUPLINGS are specially recommended for larger sizes of marine glow motors.

• • • The AUSTRO-WEBRA COUPLING is a special fit for the Austro-Webra 61 engine to Webra marine shafts (i.e. 5mm shaft sizes). Really strong construction with ball bearing drive, all in hardened steel.

• • • DAVIES-CHARLTON COUPLINGS match the two sizes of flywheels standard for D.C. marine engines - i.e. match the pin spacing in these engine flywheels.



TAYCOL UNIVERSAL COUPLINGS

K-C301	3/32" (.094") to 4BA thread
K-C302	3/16" (.188") to 4BA thread
K-C303	1/4" (.250") to 4BA thread

GRAUPNER NYLON COUPLINGS

K-G359/1	2.0mm (.080")	to 2.0 or 3.0mm
K-G359/2	3.0mm (.118")	to 2.0 or 3.0mm
K-G475/2	2.0mm (.080")	to 2.0mm (.080")
K-G475/4	2 or 3 or 4mm	to 2 or 3 or 4mm

AUSTRO-WEBRA BALL BEARING COUPLINGS

K-AW1159/4	¼UNF thread to 5mm (.197")

DAVIES CHARLTON FLYWHEEL COUPLINGS

K-DC80	1/8" to D.C. Dart Flywheel
K-DC81	5/32" to Merlin/Spitfire/Sabre

The two main types of modern internal-combustion engines are DIESELS and GLOW MOTORS. Diesels were developed in Europe, and Glow Motors mainly in the United States. Diesels remain a favoured type for production in Britain, but most other countries now produce Glow Motors to the virtual exclusion of diesels. Leading manufacturing countries are JAPAN, UNITED STATES and GERMANY - and BRITAIN for diesels.

DIESELS

The attraction of diesels is that they require no ignition system at all. Just a can of diesel fuel and they are ready to go. The fuel charge is automatically 'fired' on each revolution by the heat of compression developed as the piston approaches 'top dead centre' position in the cylinder.

To adjust the compression for proper 'firing' conditions, diesels are fitted with a contra-piston in the head of the cylinder, the position of which is adjustable via a screw in the top of the head (fitted with a tommy-bar handle for ease of manipulation). Screwing down this screw increases the compression, and vice versa.

A separate fuel control is also necessary to adjust the amount of mixture sucked into the cylinder on each revolution. This is provided by a needle valve screwing in or out of the spraybar.

With any new diesel, follow the manufacturer's instructions for compression setting and needle valve setting when starting for the first time. The technique for adjusting both compression and needle valve for starting and then adjusting the engine for smooth running will soon become familiar - and instinctive.

Diesels are a favoured choice for free-flight and R/C sports models; and of course control line models. The watercooled diesel is also a popular choice for model power boats.

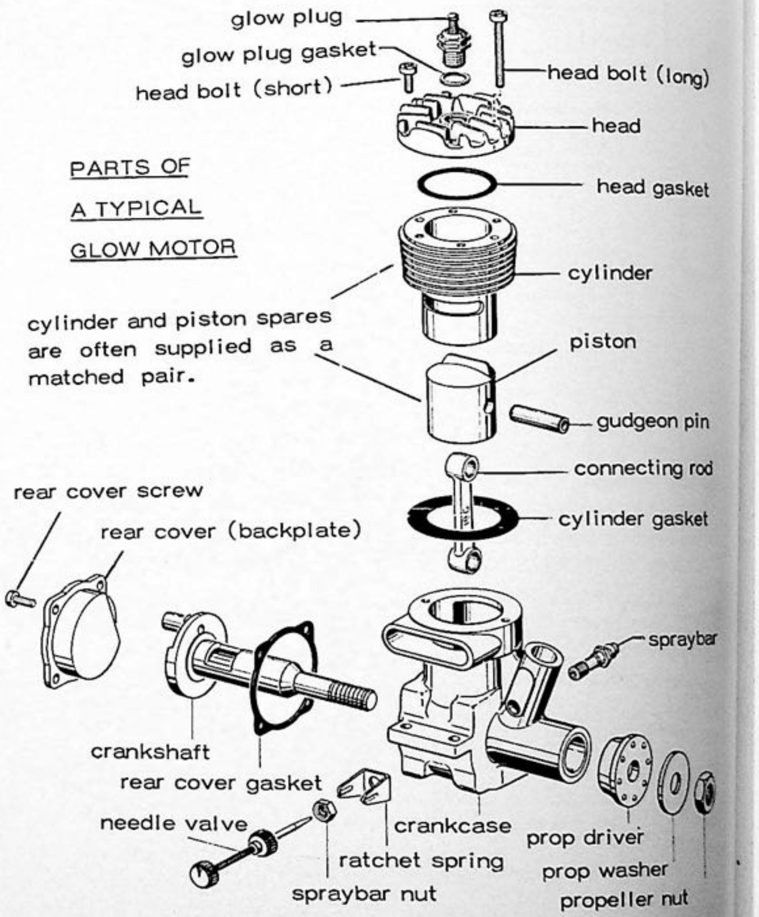
GLOW MOTORS

Glow motors are the modern counterpart of the spark-ignition engine - much faster revving and developing much more power for the same engine size. No separate ignition system is required, but a battery is required to connect to the glow plug to heat the element for starting. When running the battery can be disconnected as the glow plug will then 'fire' the fuel mixture automatically with correct 'timing'.

Glow motors will only run on Glow Fuel, which is based on alcohol (usually methanol). A certain amount of 'nitro' may also be incorporated in the fuel to improve running characteristics. Most glow motors are designed to run on 'low nitro' fuel. High performance glow motors may require 'hotter' fuels to give their best performance (i.e. fuels with a higher 'nitro' content).

Glow motors have only a single control - the needle valve controlling the amount of fuel sucked in on each revolution. This makes for simpler starting and simpler adjustment, once the basic technique has been mastered. (Most starting troubles, in any case, are due to a flat glow plug battery).

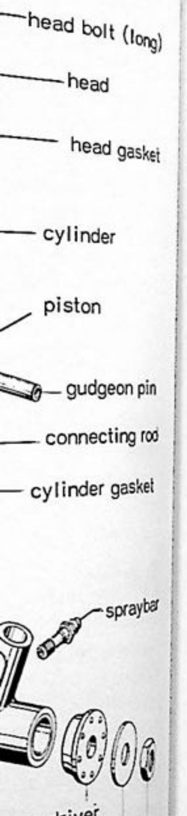
Glow motors are higher revving and smoother running than diesels. This makes them a preferred choice for R/C models - and for any contest work where maximum engine power is important. They are also available in a much wider range of sizes than diesels.


PARTS OF A TYPICAL GLOW MOTOR

cylinder and piston spares are often supplied as a matched pair.

This exploded view is a guide for identifying and naming the individual parts of a model engine correctly (necessary for ordering engine spares, for example). Not all engines, of course, have exactly the same construction - some may have a separate cylinder and cylinder liner, for example; or a different form of crankcase.

Diesels have different cylinder construction, with the cylinder head usually integral with the cylinder. There is also a contra-piston and compression adjusting screw.



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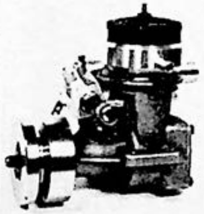
MERCO 29

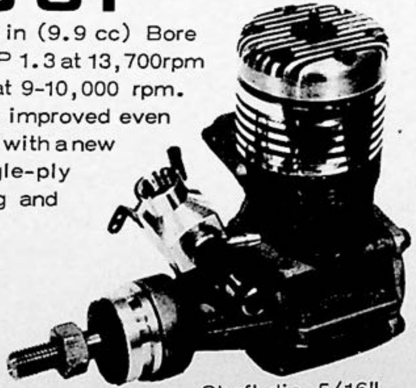
Displacement .280 cu in (4.8 cc) Bore .734" Stroke .705". BHP 0.5 at 13,400 rpm. Max torque 42 in-oz at 10,000 rpm. Positively the top British '29' and an engine that enjoys a world-wide reputation for performance and reliability. Ideal for C/L, F/F or R/C.

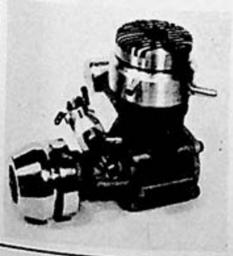


L-DJ5S	Standard Aircooled
L-DJ5R	R/C Aircooled
L-DJ5M	R/C Marine

MERCO 61

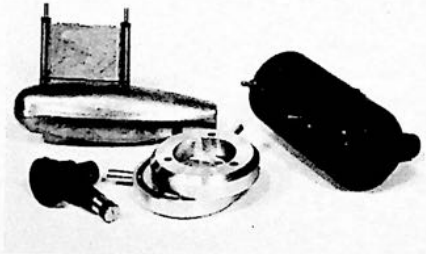
Displacement .607 cu in (9.9 cc) Bore .940" Stroke .875" BHP 1.3 at 13,700rpm Max torque 120 in-oz at 9-10,000 rpm. The Merco 61 has been improved even further in performance with a new high-compression single-ply head, enlarged porting and enlarged venturi bore.





Shaft dia 5/16".

L-DJ9R	R/C Aircooled	(Mk 4)
L-DJ9M	R/C Marine	(Mk 4)



MERCO ENGINE ACCESSORIES

L-DJ21	Universal Silencer
	PEAK POWER MUFFLER
L-DJ22	49 & 61
	MARINE MANIFOLDS
L-DJ28	29 & 35
L-DJ29	49 & 61
	FLYWHEELS
L-DJ31	29 & 35
L-DJ32	49 & 61
	WATER JACKETS
L-DJ41	49
L-DJ42	61
	METAL BLACK STREAK THROTTLES
L-DJ51M	29 & 35
L-DJ52M	49 & 61 Mk 3
L-DJ53M	49 & 61 Mk 4

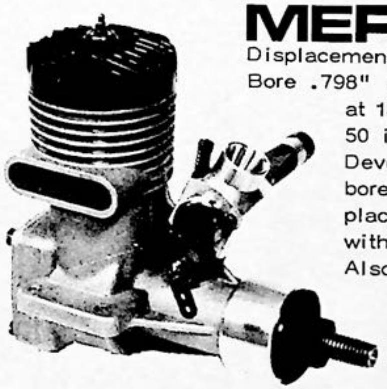
MERCO GLOWPLUGS

SHORT REACH	
L-DJ11	1½ volt
L-DJ12	2 volt
LONG REACH	
L-DJ13	2 volt
L-DJ14	2 volt R/C

For MERCO engine spares - see page 152

MERCO 35

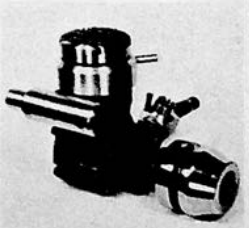
Displacement .352 cu in (5.74 cc) Bore .798" Stroke .705" BHP 0.6 at 13,400 rpm. Max torque 50 in-oz at 10,000 rpm. Developed from the '29', bored out for increased displacement and more power, with plain or R/C carburettor. Also watercooled version.



L-DJ6S	Standard Aircooled
L-DJ6R	R/C Aircooled
L-DJ6M	R/C Marine

MERCO 49

Displacement .489 cu in (8.01 cc) Bore .880" Stroke .805" BHP 0.9 at 13,500rpm. Smooth and powerful running with high torque developed right through the speed range. Fitted with an R/C carburettor as standard and available in both aero and watercooled versions.



L-DJ8R	R/C Aircooled
L-DJ8M	R/C Marine

DC ENGINES AND ACCESSORIES

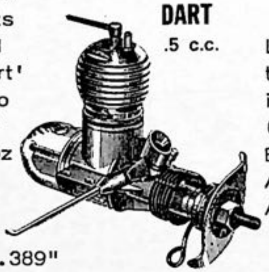
RIPMAX

BRITISH DESIGNED ... BRITISH MADE ... THE BEST !

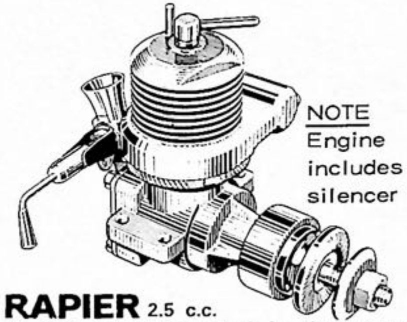
Easy-starting ... powerful ... dependable ... and really built to last! This range of world-famous compression-ignition or DIESEL engines covers all five popular sizes - from 0.5cc up to 2.5cc. Equally suitable for free flight, control line or R/C models ... and the DC range of diesels are also available in WATERCOOLED MARINE VERSIONS, complete with matching flywheel. (Conversion watercooled heads and flywheels are also available separately - see listing opposite).

WASP
.8 c.c.

DART
.5 c.c.



Baby motor in the range is the 0.5cc DART - the ideal choice of engine for the smaller sports model. Fitted with angled needle valve and 'Quickstart' spring starter (exclusive to DC engines). Bore 0.35" Stroke 0.35". Weight 1.25 oz Cat no L-DE5. The 0.8cc WASP is the exception in the DC range - a fast-revving, powerful sports GLOW MOTOR. Bore .407" Stroke .389" Weight 1.52oz. cat no L-DE2. Radial Mount Aircooled L-DE2R

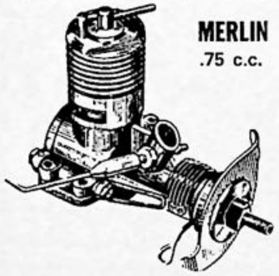


NOTE
Engine includes silencer

RAPIER 2.5 c.c.

Largest and most powerful in the range, the 2.5cc RAPIER features rear-rotary induction. Available in standard form (as illustrated) or with R/C throttle. Bore .578". Stroke .570".

Aircooled Standard - cat no L-DE3
Aircooled R/C - cat no L-DE4

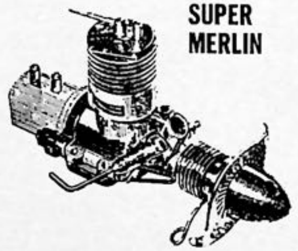


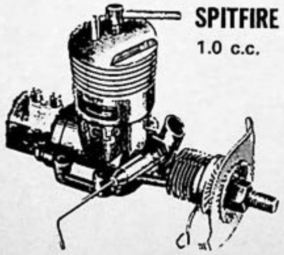
MERLIN
.75 c.c.

THE CHOICE for the small/medium size sports model - or C/L stunt, etc.. Fitted with DC QUICKSTART starter. Front induction with angled needle valve. The SUPER MERLIN is the same specification but fitted with integral fuel tank.

MERLIN aircooled cat no L-DE6
SUPER MERLIN aircooled L-DE7

SUPER MERLIN



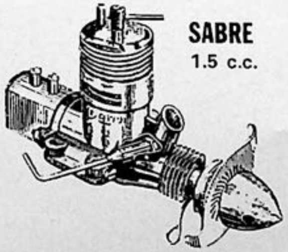


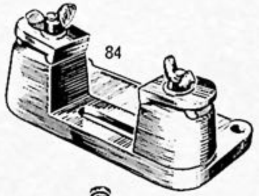
SPITFIRE
1.0 c.c.

The SPITFIRE is recommended for free flight models up to 44" span, and the SABRE for models up to 48" span. Both excellent for control line, too. DC QUICKSTART and integral tank are standard on both engines.

SPITFIRE aircooled cat no L-DE8
SABRE aircooled cat no L-DE9

SABRE
1.5 c.c.





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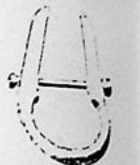
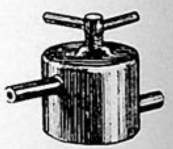
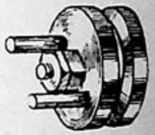
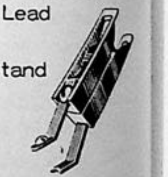
ACCESSORIES









	SILENCER
L-DE22	DC Wasp
L-DE26	Merlin
L-DE28	Spitfire & Sabre
L-DE32	Beam Mounting Tank DC Wasp
	RADIAL TANK-MOUNT
L-DE42	DC Wasp
L-DE45	DC Dart
	WATERCOOLED HEAD
L-DE53	DC Rapier
L-DE55	DC Dart
L-DE56	DC Merlin
L-DE58	DC Spitfire
L-DE59	DC Sabre
	FLYWHEEL
L-DE63	DC Rapier
L-DE65	DC Dart
L-DE66	DC Merlin
L-DE68	DC Spitfire
L-DE69	DC Sabre
L-DE72	Spanner DC Wasp
L-DE80	4BA Extended Comp Screw
L-DE81	2BA Extended Comp Screw
L-DE82	DC Quicklip with Lead
L-DE83	DC Quicklip only
L-DE84	DC Engine Test Stand
	DC GLOWPLUG
L-EG16	1.5v Short Reach
L-EG16L	1.5v Long Reach
L-EG200	2.0v Long Reach

NEEDLE VALVE ASSEMBLIES

	DIESELS 0.5-1.5cc	DC WASP ONLY	DC RAPIER ONLY
Needle Valve Assembly	L-DE90	L-DE97	L-DE100
Needle Valve only	L-DE91	L-DE98	L-DE101
Valve Body only	L-DE92	L-DE99	L-DE102
Extended Needle Valve	L-DE94	-	-
R/C Barrel & Needle Assy	-	-	L-DE110
R/C Needle Valve only	-	-	L-DE111
R/C Valve Body only	-	-	L-DE112

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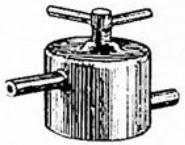

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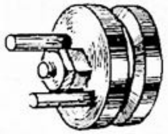

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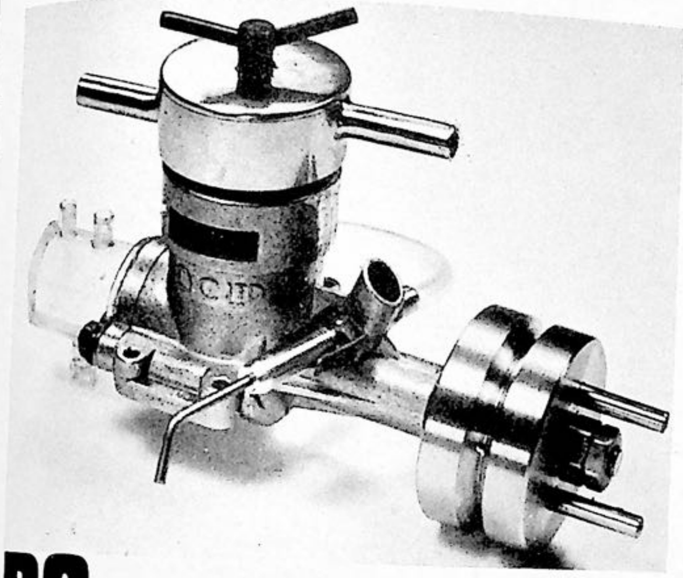
DC Wasp
ended Comp Screw
ended Comp Screw
klip with Lead
klip only
he Test Stand
VPLUG
rt Reach
g Reach
g Reach

C WASP ONLY	DC RAPIER ONLY
DE97	L-DE100
DE98	L-DE101
DE99	L-DE102
-	-
-	L-DE110
-	L-DE111
-	L-DE112

DC MARINE ME ENGINES



DC MARINE DIESELS...

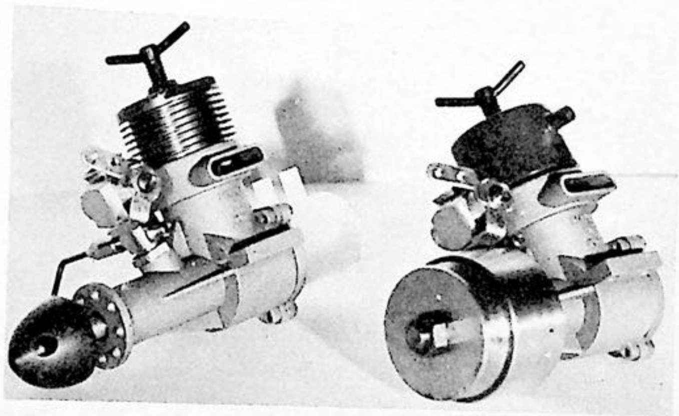
Identical in specification to their aero-engine counterparts except for a watercooled head replacing the finned cylinder - plus matching solid brass flywheel with fitted steel coupling pins. Photo shows the marine version of the SABRE. Note the really rugged beam mounting - the angled needle valve - integral tank - easy to grip compression adjusting screw - double nuts for locking the flywheel onto the crankshaft. All features which pay out in reliability and easy handling in a marine installation. For longer duration running the tank can be disconnected and the fuel line taken to a separate tank.

L-DE13	DC Rapier	Std (2.46cc)
L-DE14	DC Rapier	R/C (2.46cc)
L-DE15	DC Dart	Std (0.55cc)
L-DE16	DC Merlin	Std (0.76cc)
L-DE18	DC Spitfire	Std (0.98cc)
L-DE19	DC Sabre	Std (1.49cc)

"ME" DIESELS

MADE IN THE ISLE OF MAN

For the modeller who wants to 'fit and forget' an engine - the HERON or SNIPE is a recommended choice. Both are really EASY STARTING - and virtually unbeatable for RELIABILITY and value for money. Specification includes super-finished bores, special high tensile crankshafts, long life low friction plain bearings, etc. and integral tank.



SNIPE

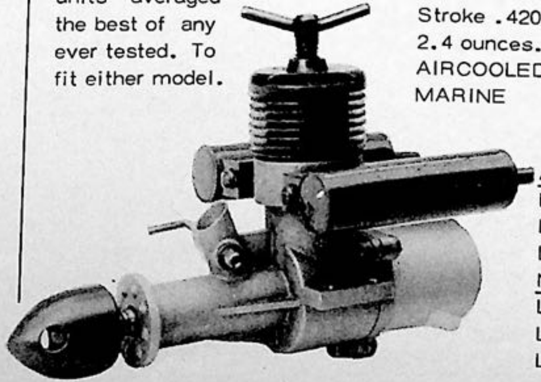
Displ: 1.49cc
Bore : .505"
Stroke: .455"
Weight 3¾oz

AIRCOOLED	STD	L-ME41
AIRCOOLED	R/C	L-ME42
MARINE	STD	L-ME43
MARINE	R/C	L-ME44

Twin Silencers Extra

TWIN SILENCERS

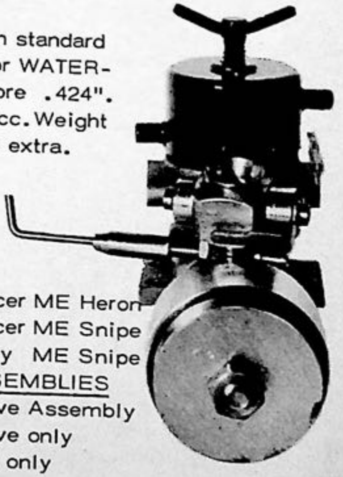
For quiet running with virtually no power loss. Independent tests report these silencer units averaged the best of any ever tested. To fit either model.



HERON

The 1cc HERON is available with standard needle valve only, and in AERO or WATER-COOLED MARINE versions. Bore .424". Stroke .420". Displacement 1.0cc. Weight 2.4 ounces. Twin silencers are extra.

AIRCOOLED - L-ME31
MARINE - L-ME33



ACCESSORIES

L-ME35	Twin Silencer ME Heron
L-ME45	Twin Silencer ME Snipe
L-ME46	Throttle only ME Snipe

NEEDLE VALVE ASSEMBLIES

L-ME350	Needle Valve Assembly
L-ME351	Needle Valve only
L-ME352	Valve Body only

ENYA ENGINES

ENYA 09 Standard L-EY1G
R/C L-EY2G

Super easy starting, fast and powerful. The little engine with a big punch!

ENYA 15 Standard L-EY1J
R/C L-EY2J

The engine that really gets your sports R/C model off the ground. Plus really flexible throttle control.

ENYA 19 Standard L-EY1M
R/C L-EY2M

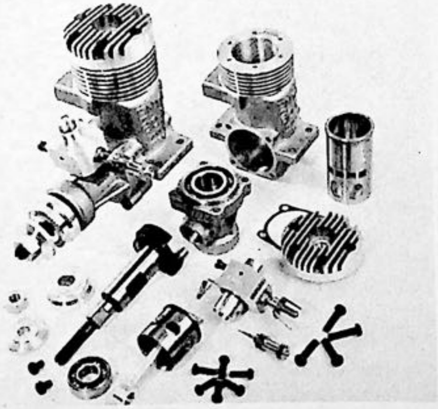
A highly developed 19 where power output has been stepped up to 0.4 BHP plus, without sacrificing easy starting.

ENYA 19BB Standard L-EY1N
R/C L-EY2N

Ball bearing version of the fabulous '19' for extra smoothness and top rpm performance. Spec. otherwise identical.

ENYA 29 Standard L-EY1P
R/C L-EY2P

A NEW engine which fills the gap between a 19 and a 35 - for those intermediate size C/L, F/F or R/C models. Displacement 0.299 cu in (4.91cc) Bore 0.736" Stroke 0.704" Weight 7.7ozs Std. 8.6 ozs R/C. Max. power 0.8 BHP Std. 0.5 BHP R/C.



ENYA 29BB Standard L-EY1Q
R/C L-EY2Q

Twin ball race version of the NEW 29 with performance uprated to 0.85 BHP Std. 0.55 BHP R/C. Rpm range 2-17500.

ENYA 35 Standard L-EY1R
R/C L-EY2R

This plain bearing model is supplied with alternative low and high compression heads to match straight and doped fuels.

ENYA 35BB Standard L-EY1S
R/C L-EY2S

Ball bearing version of the 35. Rated at 0.85 BHP! Weight 9.1 ounces.

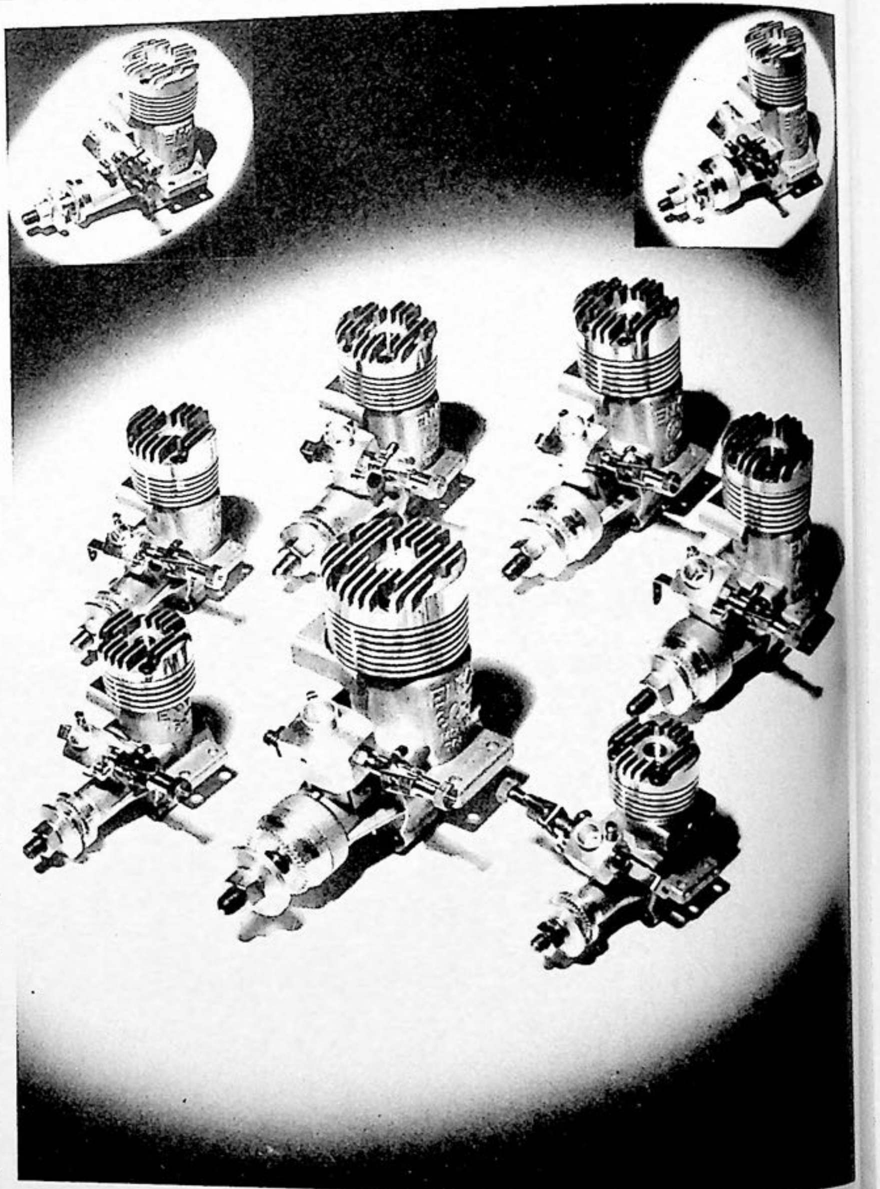
ENYA 45BB R/C L-EY2T

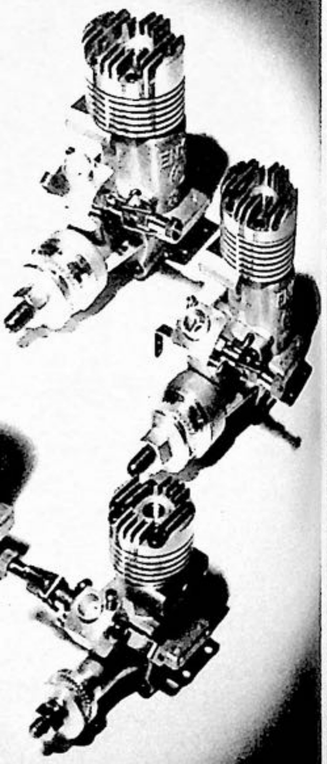
Our personal choice for aerobatic aircraft up to 60" span or larger sports or scale models.

ENYA 60BB R/C L-EY2V

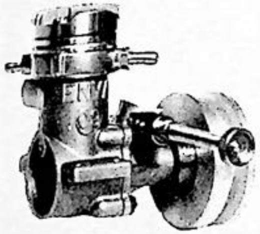
Top of the ENYA line for power and performance and the best value for money anywhere in 60's.

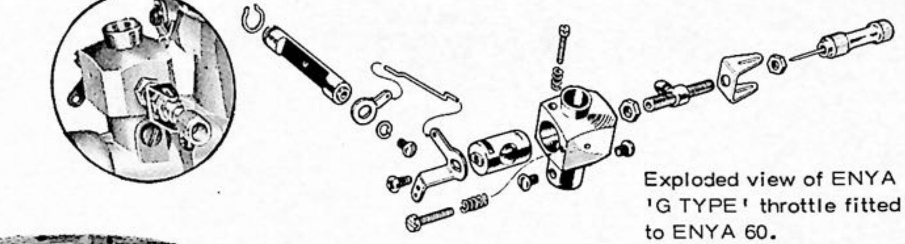
ENYA ENGINES are precision engineered by Japanese master craftsmen who jealously safeguard the ENYA name! Outstanding features are easy starting and handling characteristics ... smooth-smooth running at all speeds (ideal for R/C models) ... reliability ... and long-long life. Plus, of course, a material and manufacturing specification that is second to none. Throttle designs fitted to R/C versions are exceptionally well developed for 'full range' response and reliable idle. ENYA engines have won a WORLD R/C CHAMPIONSHIP - what better proof of their performance.



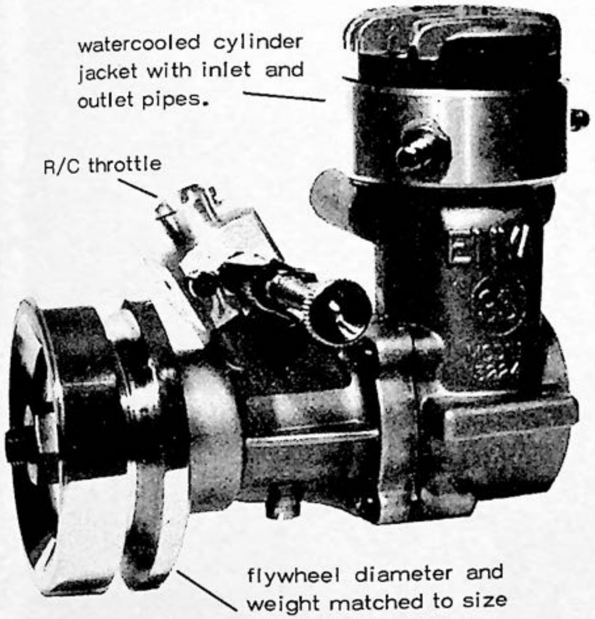


ENYA ENGINES





Exploded view of ENYA 'G TYPE' throttle fitted to ENYA 60.


watercooled cylinder jacket with inlet and outlet pipes.
R/C throttle
flywheel diameter and weight matched to size and power of engine.

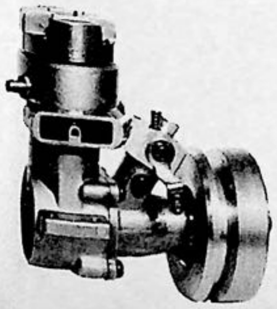
ENYA MARINE...

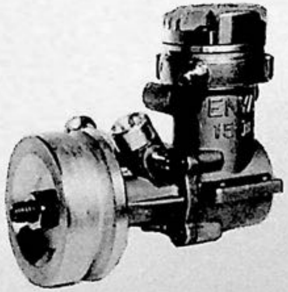
ENYA MARINE ENGINES are identical in specification to their aero-engine counterparts, except that they are fitted with a water-cooled head and turned brass flywheel (with pulley groove for starting). Head and flywheel size have both been selected for optimum performance with each marinised version. All engines rated for continuous maximum power running.

MODEL	FLYWHEEL DIA.	WEIGHT	TOTAL ENGINE WT.	MAX BHP	CAT NO
ENYA 09	1½"	2.75 oz	6.15 oz	0.20	L-EY3G
09 R/C	1½"	2.75 oz	6.85 oz	0.16	L-EY4G
ENYA 15	1 5/8"	4.5 oz	9.3 oz	0.33	L-EY3J
15 R/C	1 5/8"	4.5 oz	9.7 oz	0.26	L-EY4J
ENYA 19 R/C	1.7"	5.4 oz	11.1 oz	0.34	L-EY4M
19BB R/C	1.7"	5.4 oz	11.6 oz	0.38	L-EY4N
ENYA 29 R/C	1 7/8"	7.3 oz	15.9 oz	0.50	L-EY4P
29BB R/C	1 7/8"	7.3 oz	16.4 oz	0.55	L-EY4Q
ENYA 35 R/C	1 7/8"	7.3 oz	15.9 oz	0.60	L-EY4R
35BB R/C	1 7/8"	7.3 oz	16.4 oz	0.65	L-EY4S
ENYA 45BB R/C	2"	9.0 oz	19.0 oz	0.80	L-EY4T
ENYA 60BB R/C	2"	12.0 oz	27.0 oz	1.30	L-EY4V

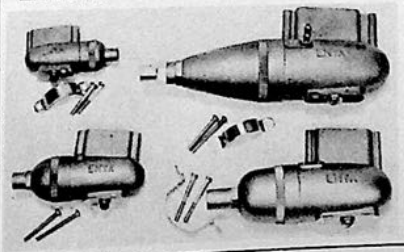
NEEDLE VALVE ASSEMBLIES

	ENYA 049
L-EY31B	Needle Valve Assembly
L-EY32B	Needle Valve only
L-EY33B	Valve Body only
	ENYA 09 STANDARD
L-EY31G	Needle Valve Assembly
L-EY32G	Needle Valve only
L-EY33G	Valve Body only
	ENYA 09, 15 & 19's R/C
L-EY43G	Needle Valve Assembly
L-EY44G	Needle Valve only
L-EY45G	Valve Body only
	ENYA 15 & 19 STD
L-EY31J	Needle Valve Assembly
L-EY32J	Needle Valve only
L-EY33J	Valve Body only
	ENYA 19BB, 29's & 35's STD
L-EY31N	Needle Valve Assembly
L-EY32N	Needle Valve only
L-EY33N	Valve Body only
	ENYA 29's, 35's & 45BB R/C
L-EY43P	Needle Valve Assembly
L-EY44P	Needle Valve only
L-EY45P	Valve Body only
	ENYA 60BB R/C
L-EY43V	Needle Valve Assembly
L-EY44V	Needle Valve only
L-EY45V	Valve Body only





ENYA ACCESSORIES



SILENCERS

L-EY5G	Enya 09	L-EY5J	Enya 15& 19's
L-EY5P	Enya 29's, 35's & 45BB	L-EY5V	Enya 60BB

THROTTLES

L-EY39G	Enya 09
L-EY39J	Enya 15
L-EY39M	Enya 19
L-EY39N	Enya 19BB
L-EY39P	Enya 29 & 35
L-EY39Q	Enya 29BB & 35BB
L-EY39T	Enya 45BB
L-EY39V	Enya 60BB

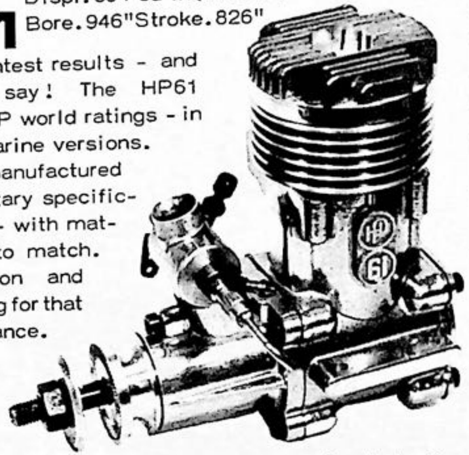
FLYWHEELS

L-EY9G	Enya 09
L-EY9J	Enya 15
L-EY9M	Enya 19
L-EY9N	Enya 19BB
L-EY9P	Enya 29 & 35
L-EY9Q	Enya 29BB & 35BB
L-EY9T	Enya 45BB
L-EY9V	Enya 60BB

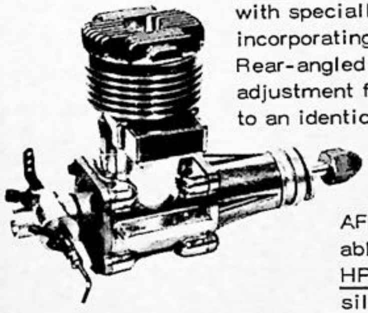
HP ENGINES

HP 61

Displ.604 cu in(9.79cc)
Bore.946"Stroke.826"

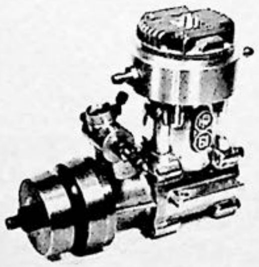


Check on the contest results - and what the experts say! The HP61 comes in the TOP world ratings - in both aero and marine versions. Designed and manufactured to exacting military specification standards - with material selection to match. Single-ring piston and Schnuerle porting for that EXTRA performance.
HP61F
cat no L-HP2G

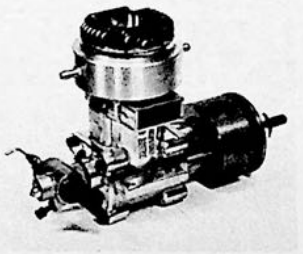


HP61F has front rotary valve induction with specially developed precision carb incorporating barrel-valve type throttle. Rear-angled fuel line connector; fine adjustment for idle setting. HP61R is to an identical specification throughout except for the rear rotary valve and special R/C carburettor. The new AFM throttles are also available for the 61.
HP61R weight 19 ozs (incl. silencer) cat no L-HP2H.

HP 61F MARINE R/C
Cat no L-HP4G

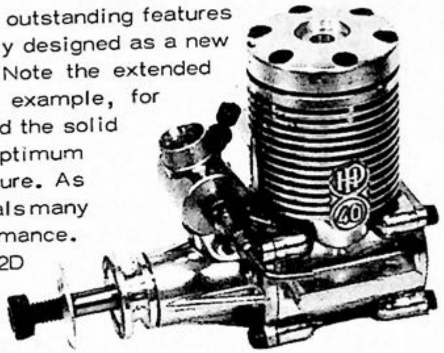


HP61R MARINE R/C
Cat no L-HP4H

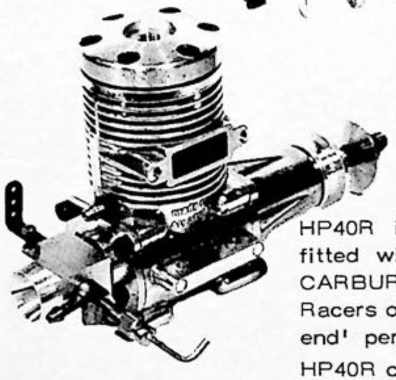


HP 40

Displacement - 6.4 cc
Bore .826" Stroke .732"



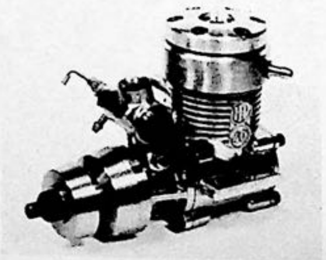
The HP40 has all the outstanding features of the 61, but actually designed as a new engine throughout - Note the extended cylinder finning, for example, for optimum cooling - and the solid head to maintain optimum combustion temperature. As a result the HP40 rivals many 60's for sheer performance.
HP40F cat no L-HP2D



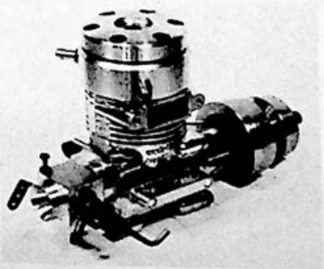
The HP40F is a front rotary with similar R/C carburettor design to the HP61 - and every bit as flexible and responsive.

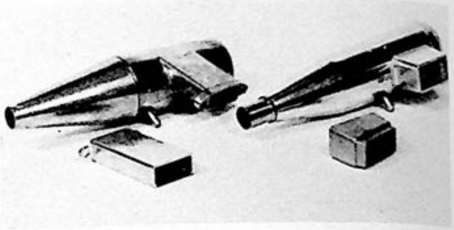
HP40R is a rear rotary variant fitted with a special SPEED CARBURETTOR - ideal for Pylon Racers or on models where 'top end' performance really counts.
HP40R cat no L-HP2C
Weight 9 7/8 ounces

HP40F MARINE R/C
Cat no L-HP4D

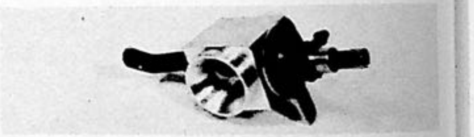


HP40R MARINE R/C
Cat no L-HP4C

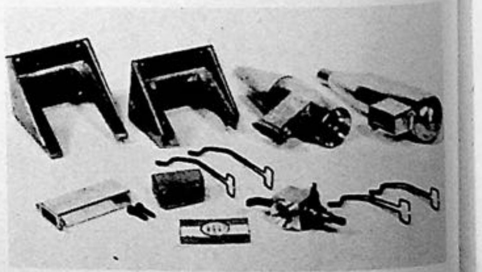


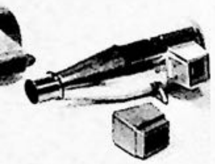


SILENCERS	
L-HP70C	HP40R & HP40F
L-HP70E	HP61R & HP61F
SILENCER EXTENSION & CLIPS	
L-HP78E	to fit part no L-HP70E
EXHAUST STUBS	
L-HP82C	HP40R & HP40F
RADIAL MOUNTS	
L-HP85E	HP61R
L-HP85G	HP61F
THROTTLES	
L-HP71C	HP40R (PR)
L-HP71D	HP40F
L-HP71E	HP61R & HP61F
AFM THROTTLE	
L-HP71Y	HP61R & HP61F



NOTE: For HP engine spares see pages 154/155.





40R & HP40F
61R & HP61F
ENSION & CLIPS
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40R (PR)
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61R & HP61F

61R & HP61F

engine spares
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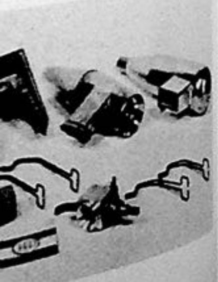
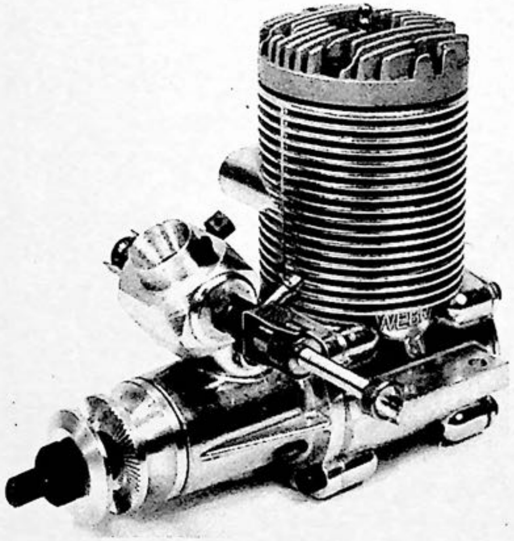
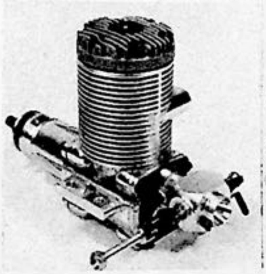
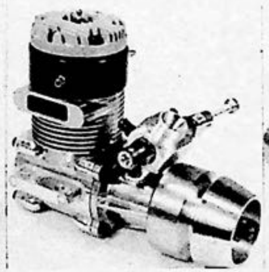


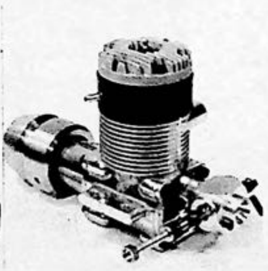


AUSTRO-WEBRA 61

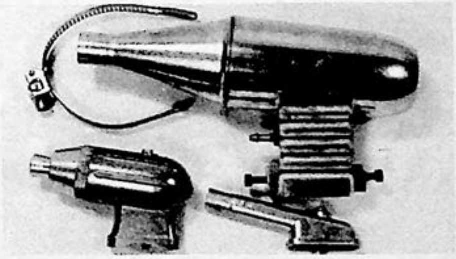
The WEBRA name is world famous for glow motors - and rightly so. But when they decided to produce a new range of high-performance engines they took all the best features of existing designs and improved on them. They added that extra touch of quality where it paid out best - in performance and handling qualities. Finally they built a new factory to handle production! AUSTRO WEBRA 61 displacement .61 cu ins (9.95 cc) Bore .944" (24 mm) Stroke .866" (22 mm) Weight 24 ozs. Available in front rotary and rear rotary R/C versions; aircooled or marine. Helicopter version has different shaft size and driving discs to suit Schluter helicopters.

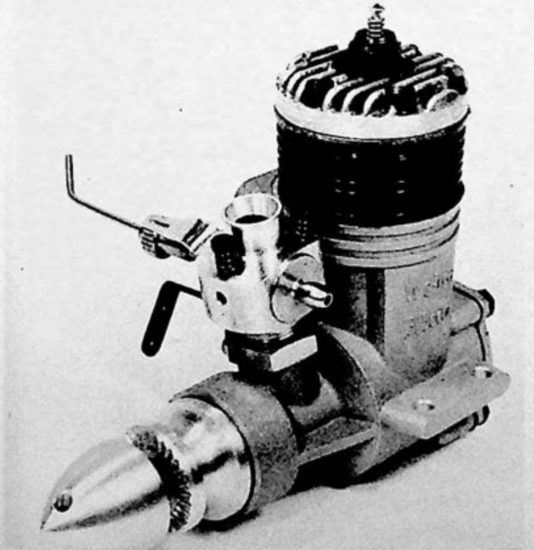






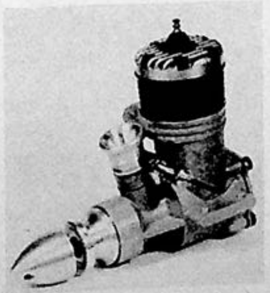
	AUSTRO-WEBRA 20
L-AW1016	Standard Aircooled
L-AW1017RC	R/C Aircooled
L-AW1017RCW	R/C Marine
	AUSTRO-WEBRA 61F
L-AW1024RC	R/C Aircooled
L-AW1025RCW	R/C Marine
L-AW1029RC	Helicopter
	AUSTRO-WEBRA 61R
L-AW1026RC	R/C Aircooled
L-AW1027RCW	R/C Marine

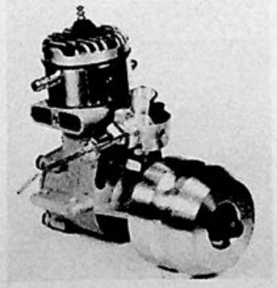




AUSTRO-WEBRA 20

A '20' fitted with precision ballrace crankshaft to give even more power! Available with standard carburettor (for free flight or control line), or R/C throttle. Also marine R/C version. A high-specification front rotary engine for the serious modeller - who wants top engineering quality and performance. Displacement .20 cu in (3.5 cc) Bore .649" (16.5 mm) Stroke .610" (16 mm) Weight - Standard and R/C 6¼ ozs Marine, complete with water jacket and flywheel 12 ozs.





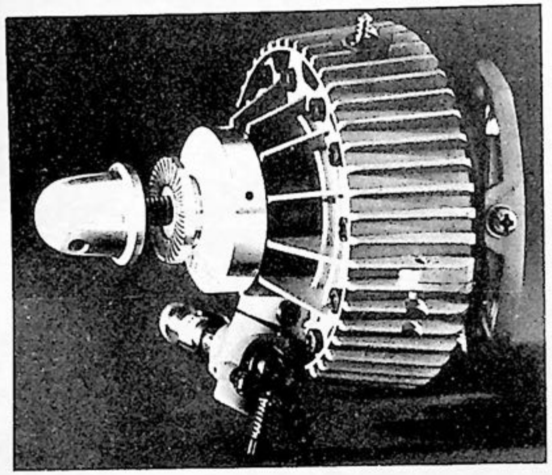
ACCESSORIES

L-AW1100/3	Silencer A-W20
L-AW1100/ST	Marine Manifold A-W20
L-AW1100/6ER	Silencer A-W61F & 61R
L-AW1103	Spare Clip 61F & 61R Silencer
L-AW1017/16F	Throttle only A-W20
L-AW1026/16F	" " A-W61F & 61R

NEEDLE VALVE ASSEMBLIES

L-AW1016/NVA	Needle Valve Assy.	A-W 20 Std.
L-AW1016/14	Valve Body only	A-W 20 Std.
L-AW1016/18	Needle Valve only	A-W 20 Std.
L-AW1017/NVA	Needle Valve Assy.	A-W 20 R/C
L-AW1017/16A	Valve Body only	A-W 20 R/C
L-AW1017/33	Needle Valve only	A-W 20 R/C
L-AW1024/NVA	Needle Valve Assy.	A-W 61F & 61R
L-AW1024/16A	Valve Body only	A-W 61F & 61R
L-AW1024/33	Needle Valve only	A-W 61F & 61R

ENGINES
WANKEL
GRAUPNER HB



WANKEL ENGINE

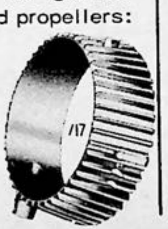
Designed by German technicians, the prototype of the GRAUPNER WANKEL engine first ran in 1961. Subject to intensive testing and development, it was finally brought to the production stage by Japanese model engine experts.

Outstanding features are compactness, amazing smoothness of running and almost complete freedom from vibration. Throttle-type carburettor gives smooth speed control over the full operating range. Special silencer reduces noise to a minimum with virtually no loss of power.

TECHNICAL DATA: Displacement 4.9 cc. Weight (motor) 310 grams. (cooling ring) 25 grams. (silencer) 33 grams. Recommended propellers: 9 x 5, 9 x 5½, 9 x 6 or 10 x 4.

L-G1800	Basic Engine only
• L-G1800/17	Finned Cooling Ring
• L-G1800/34	Radial Mounting Plate
L-G1800/33	Silencer
• L-G1606	Glo Plug

• Essential Accessories



GRAUPNER HB ENGINES

	GRAUPNER HB20
L-G1525	R/C Aircooled
L-G1526	R/C Marine
	GRAUPNER HB61
L-G1531	R/C Aircooled
L-G1532	R/C Marine
L-G1545	R/C Stamo Marine
L-G87/1	R/C Stamo Copter

ACCESSORIES

	GRAUPNER HB20
L-G1525/23	Silencer
L-G1525/15	Perry Throttle
L-G1550	Air Filter
	GRAUPNER HB61
L-G1531/23	Silencer
L-G1540	Silencer Extension
L-G1541	Silencer Venturi Plug
L-G1546	Copter Silencer
L-G1531/15	Perry Throttle
L-G1543	Fuel Filter
L-G1544	Air Filter
L-G254	HB20 & HB61 Crankshaft Spinner Nut
	NEEDLE VALVE ONLY
L-G1525/14	Graupner HB20
L-G1531/14	Graupner HB61
L-G1542	In-Flight Adjust N/V Graupner HB61

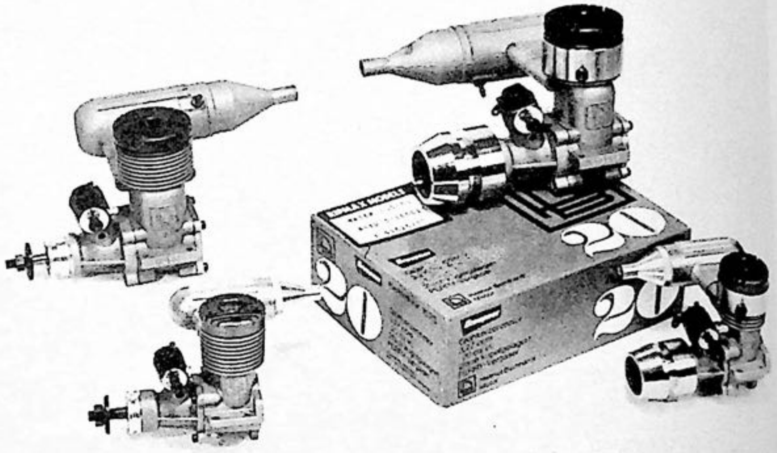
1540

1543

1541

254

1550



From our own tests - and hundreds of hours of demonstration flying - we rate the GRAUPNER HB engines high in the list. They have that little extra in power, smooth running, easy handling, and reliability.

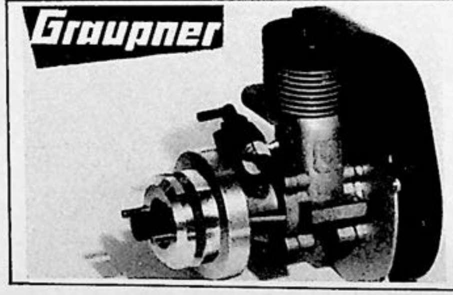
HB61 R/C Displacement: 0.61 cu in (9.97 cc)

Bore: 24mm Stroke: 22mm Weight: 14 5/8 oz

With R/C-type throttle as standard, this engine comes in two versions - aircooled and marine. Accessories available include silencer, fuel filter and air filter. Also matching PERRY THROTTLE.

HB20 R/C Displacement: 0.20 cu in (3.27 cc)

Bore: 16.1mm Stroke: 16mm Weight: 6 3/8 oz.



R/C STAMO ENGINES

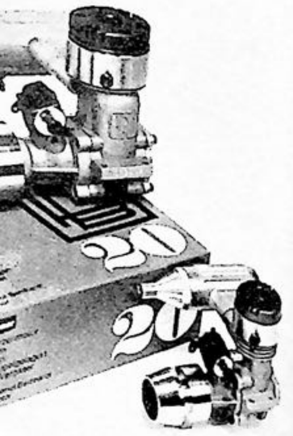
Basically the HB61 R/C aircooled engine, fitted with crankshaft-driven fan and special duct for cooling. Specification otherwise identical. There are two versions of the R/C STAMO - the COPTER motor specially developed for R/C helicopters where the engine is fully enclosed by the fuselage: and the R/C STAMO MARINE. The R/C motor for models where RELIABILITY COUNTS.

ENGINE

With the high
on modern glo
Faster, more
starting-and s
engage with th
spinnered prop
and helicopte
other accesso
accumulator.
ller engines.
that suits yo
GRAUPNER

SULLIVAN E
Powerful NE
with 'trigger-
L-SL901 Su
L-SL902 Su

STARTER A
L-SL911
L-SL913
L-SL914
L-SL915
L-SL916
L-SL917
L-SL918



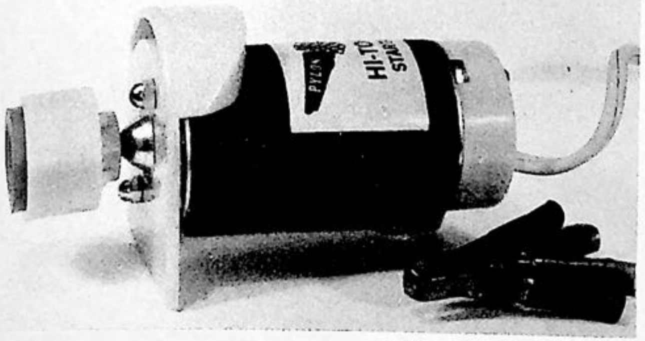
and nundreds of hours of
ve rate the GRAUPNER HB
They have that little extra
ing, easy handling, and

nt: 0.61 cu in (9.97 cc)
mm Weight: 14 5/8 oz
as standard, this engine
- aircooled and marine.
nclude silencer, fuel filter
ching PERRY THROTTLE.
nt: 0.20 cu in (3.27 cc)
16mm Weight: 6 3/8 oz.

ENGINES

gine, fitted with crank-
cooling. Specification
versions of the R/C
lly developed for R/C
closed by the fuselage:
R/C motor for models

GRAUPNER ENGINE ACCESSORIES



ENGINE STARTERS...

With the higher compression ratios and advanced ignition on modern glow motors, an electric starter makes sense ! Faster, more reliable and more positive than finger-starting-and safer. For aero-engine starting, most units engage with the spinner (some have adaptors to fit a non-spinnered prop). Belt starting is used on marine engines and helicopter motors. Most starters are complete with other accessories. All are intended to work off a 12 volt accumulator. 6 volts may be sufficient power to start smaller engines. Check the full RIPMAX range to find the one that suits your requirements best - KAVAN, MARX, GRAUPNER and SULLIVAN (shown in photo above).

SULLIVAN ENGINE STARTER (12 VOLTS)

Powerful NEW 'HI-TORQUE' direct drive unit with 'trigger-grip' on-off switch in two versions.

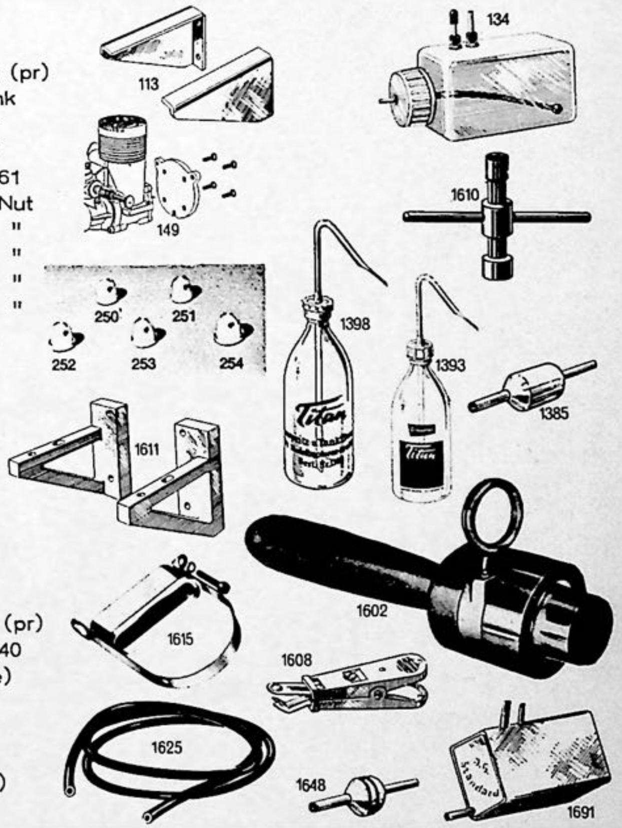
L-SL901	Sullivan Aircraft Starter (illustrated)
L-SL902	Sullivan Universal Starter with Ally V-Pulley.

STARTER ACCESSORIES AND SPARES

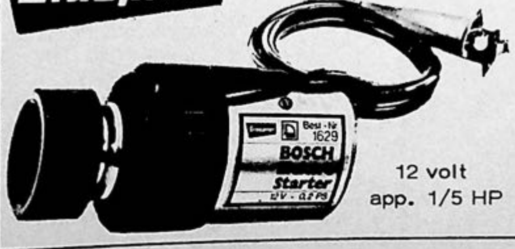
L-SL911	Reversible Prop/Spinner Rubber only
L-SL913	Race Car Rubber only
L-SL914	Plastic Drive Head only
L-SL915	Ally Drive Head only
L-SL916	Plastic Hand Guard only
L-SL917	Plastic End Cap only
L-SL918	Switch Assembly only

GRAUPNER ENGINE ACCESSORIES

L-G113	Engine Beam Mounts .049-.09 (pr)
L-G134	100cc (3½oz) Square Klunk Tank
L-G135	250cc (8¾oz) " " "
L-G136	500cc (17½oz) " " "
L-G149	Engine Backplate Mount .29-.61
L-G250	5mm Metric Threaded Spinner Nut
L-G251	3/16" UNF " " "
L-G252	7/32" " " " "
L-G253	6mm Metric " " "
L-G254	¼" UNF " " "
L-G260	60cc (2oz) Square Klunk Tank
L-G261	160cc (5½oz) " " "
L-G262	315cc (11oz) " " "
L-G263	415cc (14½oz) " " "
L-G1385	Plastic In-Line Fuel Filter
L-G1393	200cc (7oz) Squeeze Bottle
L-G1398	500cc (17½oz) " "
L-G1602	Graupner Engine Pull-Starter
L-G1608	Glo-Clip only
L-G1628	" " & Leads
L-G1610	8/10mm Cross Wrench
L-G1611	Engine Beam Mounts .29-.61 (pr)
L-G1615	Silencer Adaptor OS 30, 35 & 40
L-G1625/1	Small Neoprene Tube (1 metre)
L-G1625/2	Medium " " "
L-G1625/3	Large " " "
L-G1648	Ally In-Line Fuel Filter
L-G1691	60cc Metal Tank (for Amateur)



BOSCH ELECTRIC STARTER cat-no L-G1629



12 volt
app. 1/5 HP

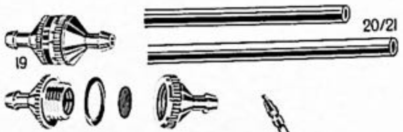
The de luxe model in the starter range. Precision-built industrial motor with heavy duty armature and commutator and extra fast turnover. Fully complete with heavy-duty connecting leads, spinner driver, etc. Positive switching action and body casing tailored for easy handling. Weight 1300 gr. (46 oz) Motor size 112mm x 60mm dia (4½" x 2¼" dia.)

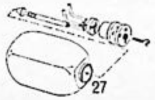
KAVAN, RIPMAX ENGINE ACCESSORIES

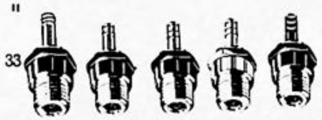
RIPMAX

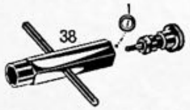
KAVAN ENGINE ACCESSORIES

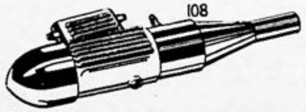
L-FK19	Take-Apart Fuel Filter
L-FK20	Rubber Fuel Tubing (40")
L-FK21	Silicone Fuel Tubing (20")
L-FK25	Squeeze Bottle with Twist Cap
L-FK26	Tank Extender for Cox .049
L-FK27	4 oz Sealtite Square Klunk Tank
L-FK28	6 oz " " " "
L-FK29	8 oz " " " "
L-FK30	10 oz " " " "
L-FK31	14 oz " " " "
L-FK33	Hot Glow Plug (red)
L-FK34	Warm Glow Plug (yellow)
L-FK35	Cold Glow Plug (blue)
L-FK36	Super Glow Plug (green)
L-FK37	Speed Glow Plug (black)
L-FK38	Plug Spanner
L-FK39	Push-On Glow Clip
L-FK108	Venturi Muffler
L-FK108A	" " Straps only
L-FK109	" " Extension piece
L-FK109A	" " " Strap
	MUFFLER ADAPTOR
L-FK110/0	ST51-56-60 K & B 40 F & R
L-FK110/1	ST G60F1 & RV
L-FK110/2	OS Max 60
L-FK110/3	Webra 61 & German Veco 61
L-FK110/4	Merco 49 & 61 Mk 1 & 2
L-FK110/5	Rossi 60
L-FK110/6	Taipan 61
L-FK110/7	Enya 45
L-FK110/8	Merco 29 & 35
L-FK110/11	Merco 49 & 61 series 3
L-FK110/13	Veco 45
L-FK110/14	Veco 61
L-FK110/15	Enya 60 Mk 3
L-FK110/16	HP61F & R
L-FK110/17	HP40F & R
L-FK110/18	OS Max 40
L-FK122	Fuel Tank Filler Plate





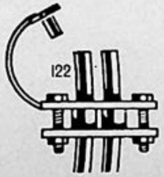






L-FK108
One of the most efficient silencers yet. Can be used as either a venturi or expansion type.

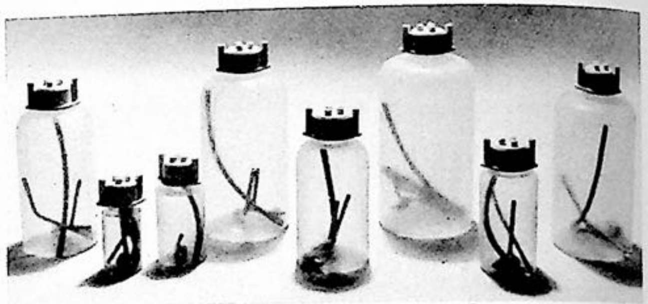
L-FK110/..
A range of adaptors to fit most .29-.61 engines.



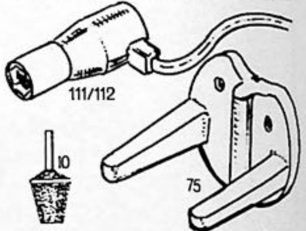
RIPMAX ENGINE ACCESSORIES

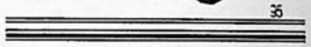
TUFTANK ROUND KLUNK TANKS

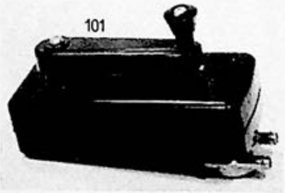
L-TT05	½ oz
L-TT1	1 oz
L-TT2	2 oz
L-TT4	4 oz
L-TT6	6 oz
L-TT8	8 oz
L-TT10	10 oz
L-TT12	12 oz

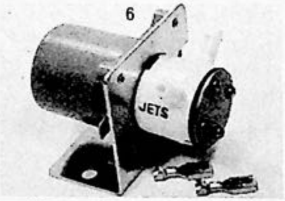


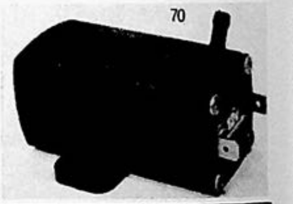
L-IP101	Mechanical Fuel Pump
L-IP111	Push-on Glow Clip with Spade Clips
L-IP112	Push-on Glow Clip with Croc Clips
L-SK10	Ripmax Sintered Klunk Filter
L-FP6	Ripmax Reversible Fuel Pump 6 v
L-FP6/1	Spare Impeller with Pin for FP6
L-RA70	Hi-Flo Fuel Pump 6v - 12v
L-RA75	Nylon Engine Mount .19 - .40
L-RA95	Black Rubber Tubing (30")











KAVAN STARTER

POSITIVE and POWERFUL - starts any engine off 12 volts (small motors on 6 volts). NEW brush-lift switching. Interchangeable spinner-drivers. Integral V-belt pulley. Its EASY STARTING with KAVAN !

L-FK111	STARTER Electric 6v-12v	
L-FK112	"	Spinner Type Friction Rubber
L-FK113	"	"V" Belt
L-FK114	"	Prop Type Friction Rubber
L-FK115	"	Car Type " "
L-FK116	"	PVC Belt
L-FK117	"	Head with Ally V-Pulley
L-FK118	"	Drill Head

L-FK111/A	Starter	Spare	End Cap & Leads
L-FK111/B	"	"	Brushes only
L-FK111/C	"	"	Armature
L-FK111/D	"	"	Switch Lever

RIPMA

FUEL

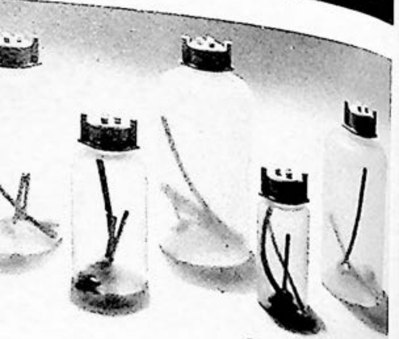
Why use a FUEL
bottle will do the s
tank? Well, great
advantage (especia
Racing). Then yo
pump to empty a ta
the connections. S
spillage when the m
home. In fact, a
accepted as a 'sta
just a gimmick.
aircraft, boats and
will serve all mode

All fuel pumps
RANGE are custom
electric motor 'con
pump has internal b
connect to a separa
have reversible mo

L-MK5 is shown

Remember - fu
for pumping MODE
suitable for pumpi
are non-lubricants
damage or seizure

RIPMAX



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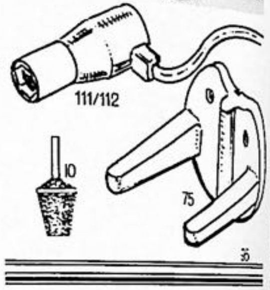
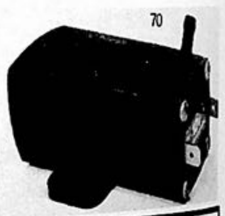
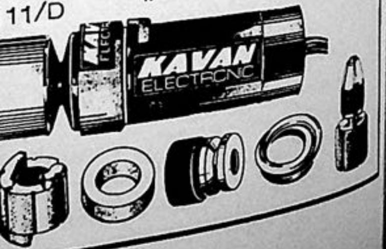




AVAN STARTER

11/A	Starter	Spare	End Cap & Leads
11/B	"	"	Brushes only
11/C	"	"	Armature
11/D	"	"	Switch Lever



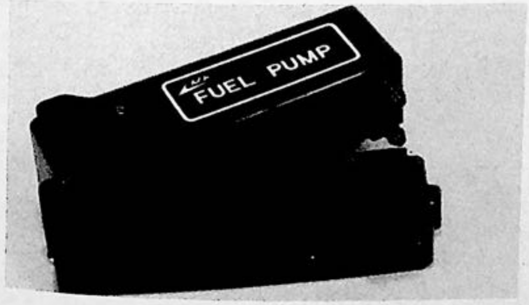
RIPMAX

ENGINE ACCESSORIES

FUEL PUMPS

Why use a FUEL PUMP when a squeeze bottle will do the same job of filling a fuel tank? Well, greater speed of filling is one advantage (especially at pit stops in Team Racing). Then you can also use a fuel pump to empty a tank, simply by reversing the connections. Saves fuel wastage - and spillage when the model is being transported home. In fact, a fuel pump is widely accepted as a 'standard' accessory, not just a gimmick. Just as useful for model aircraft, boats and cars. And one pump will serve all models.

All fuel pumps offered in the RIPMAX RANGE are custom-built for the job (not electric motor 'conversions'). The MK pump has internal batteries. Other types connect to a separate battery. All models have reversible motors.

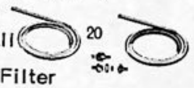


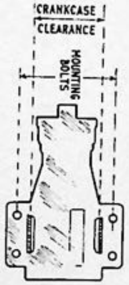
L-MK5 is shown in above photo.

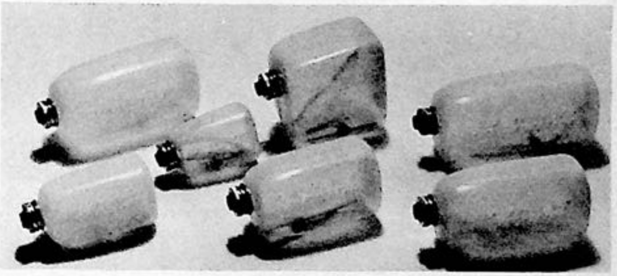
Remember - fuel pumps are designed for pumping MODEL FUELS. They are not suitable for pumping water or fluids which are non-lubricants as this could lead to damage or seizure of the pump impeller.

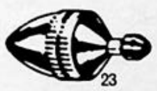
RIPMAX IM ENGINE ACCESSORIES

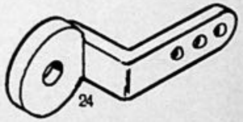
	'PROFILED' KLUNK TANK		
L-IM2	2½oz	L-IM4	4 oz
L-IM6	6 oz	L-IM8	8 oz
L-IM10	10oz	L-IM12	12oz
L-IM11	11oz (extra short)		
	SILICONE TUBING (40")		
L-IM20/S	3/32" Thinwall		
L-IM20/M	3/32" Heavywall		
L-IM22	Screw-up Line Filter		
L-IM23	Screw-up Klunk Filter		
L-IM24	Noiseless Throttle Lever (pkt 2)		
	MOUNTING TEMPLATE		
L-IM25/09	Enya 09		
L-IM25/19	Enya 19		
L-IM25/35	Enya 35		
L-IM25/45	Enya 45		
L-IM25/60	Enya 60		
L-IM26/09	O.S. 09		
L-IM26/10	O.S. 10		
L-IM26/15	O.S. 15		
L-IM26/19	O.S. 19		
L-IM26/30	O.S. 30		
L-IM26/35	O.S. 35		
L-IM26/40	O.S. 40		
L-IM26/50	O.S. 50		
L-IM26/58	O.S. 58		
L-IM26/60F	O.S. 60F		
L-IM26/60R	O.S. 60R		
L-IM27	K & B 40R		





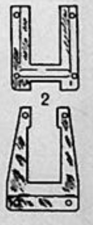


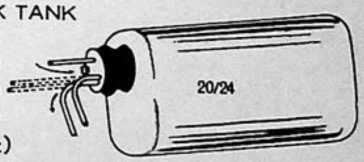




RIPMAX MK ENGINE ACCESSORIES

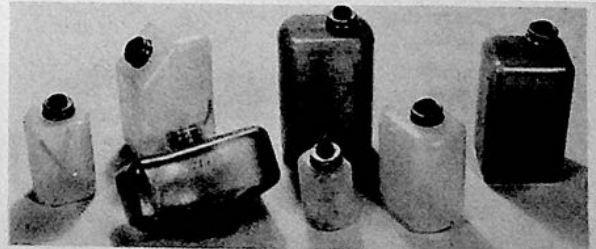
	ENGINE MOUNT PLATE		
L-MK2/A	.06-.12	L-MK2/B	.15-.19
L-MK2/C	.29-.40	L-MK2/H	.45-.61
	IN-LINE FILTER		
L-MK3N	Nylon		
L-MK3G	Gold		
L-MK4	Push-on Plug Clip		
L-MK5	Fuel Pump with Integral Battery Box		
	OVAL KLUNK TANK		
L-MK20	50cc (1¾oz)		
L-MK21	100cc (3½oz)		
L-MK22	150cc (5¼oz)		
L-MK23	220cc (7¾oz)		
L-MK24	320cc (11¼oz)		





RIPMAX-ORIENT ENGINE ACCESSORIES

	BUNGTITE KLUNK TANK		
L-OA102	2 oz	L-OA104	4 oz
L-OA107	7 oz	L-OA111	11oz
L-OA114	14oz		
L-OA211	11oz Slant Feed Klunk Tank		
L-OA310	10oz Marine V-Tank		



ENGINE ACCESSORIES

RIPMAX

HOTSPOT GLOW PLUG

The NEW design of glow plug with the (patented) soft wire element core. This acts as a heat sink, which automatically controls the element temperature for better starting, more reliable idle, more consistent power at full throttle. The core also supports the element against physical shock, preserving its life.

	HOTSPOT PLUG
L-DP3	(1½-2v) Short Reach
L-DP4	(1½-2v) Long Reach

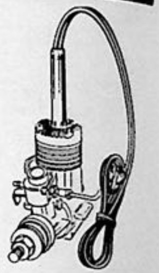
'HOTSPOT' is more than just another variation on the idlebar type of glow plug - as thousands of satisfied users will testify. The heat-sink principle REALLY DOES keep the element glowing strongly for starting (when it is often doused with cool, wet fuel) And it REALLY DOES control the element temperature for running at all speeds with starting battery disconnected. That means more efficient fuel combustion - elimination of pre-ignition - and a longer element life.

'HOTSPOT', in fact, is the greatest advance yet in glow plug design.

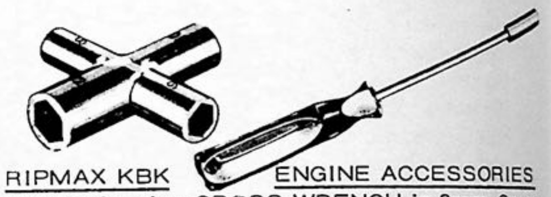
(A DELMAR product)

DU-BRO ACCESSORIES

KWIKLIP Glowplug Connector with one-piece brass barrel (snaps onto plug) with firmly anchored 24" long extension lead. Cat no - L-DB550



	KWIKLIP
L-DB552	Small Metal
L-DB553	Large Plastic



RIPMAX KBK ENGINE ACCESSORIES

Millimetre size CROSS WRENCH in 8mm, 9mm, 10mm and 12mm nut sizes. Fits nearly all Japanese engine prop nuts and most Continental engine sizes. Cat no L-KBK91.

Also specially recommended: for 8mm nuts SCHUCO GLOW PLUG SPANNER - R-U243/372

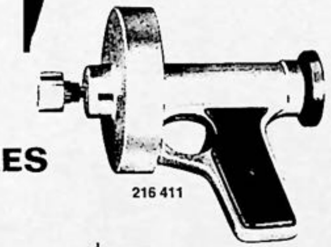
TAPPING DRILL SIZES

METRIC	drill	American NF	drill
5	4.2mm	10	4.1mm
5.5	5 mm	12	4.7mm
6	5 mm	1/4	5.5mm
7	6 mm	5/16	6.9mm
8	6.8mm	**BSF**	**drill**
9	7.8mm	3/16	3.7mm
10	8.5mm	7/32	4.6mm
BA	**drill**	1/4	5.3mm
0	5.1mm	9/32	6.1mm
1	4.5mm	5/16	6.8mm
2	4.0mm	**BSW**	**drill**
3	3.4mm	1/8	2.5mm
4	3 mm	5/32	1/8"
5	2.65mm	3/16	3.7mm
6	2.3mm	7/32	4.5mm
8	1.8mm	1/4	5.1mm
10	1.4mm	5/16	6.5mm

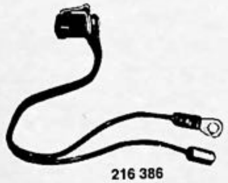
SCHUCO

ENGINE ACCESSORIES

216 384



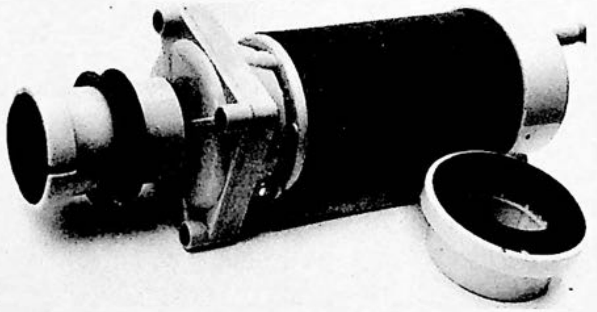
216 411



216 386

SCHUCO-HEGI ENGINE ACCESSORIES

L-U216/384	Klamp-On Glow Clip
L-U216/386	Glow Clip with Remote Socket
L-U216/411	Pistolgrip Engine Starter
L-U217/980	Klunkweight Filter



MARX LUDER STARTER.....

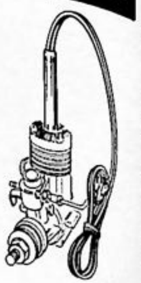
Rugged industrial motor drive rated for three minutes continuous load. Complete starter with 1.5 metre cable and plug, two cushioned spinner drivers and belt for flywheel starting. Works off 12 volt battery for 29's to 61's. For smaller engines adequate power is available from 6 volt battery.

MARX-LUDER ENGINE ACCESSORIES

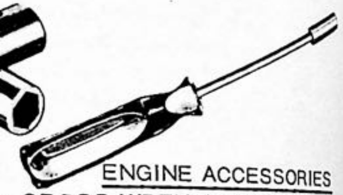
L-EM2	Electro Starter 6-12v
L-EM2/1	Adaptor to Cigarette Lighter Socket
L-EM2/2	Battery Clip Lead
L-EM2/3	Extension Cable

SSORIES

lug Connector
brass barrel
g) with firmly
ong extension
L-DB550



KWIKLIP
Small Metal
Large Plastic



ENGINE ACCESSORIES

e CROSS WRENCH in 8mm, 9mm,
nm nut sizes. Fits nearly all
ne prop nuts and most Continental
Cat no L-KBK91.
recommended: for 8mm nuts
W PLUG SPANNER - R-U243/372

PING DRILL SIZES

rill
.2mm
5 mm
5 mm
6 mm
6.8mm
7.8mm
8.5mm

drill
5.1mm
4.5mm
4.0mm
3.4mm
3 mm
2.65mm
2.3mm
1.8mm
1.4mm

American NF	drill
10	4.1mm
12	4.7mm
1/4	5.5mm
5/16	6.9mm

BSF	drill
3/16	3.7mm
7/32	4.6mm
1/4	5.3mm
9/32	6.1mm
5/16	6.8mm

BSW	drill
1/8	2.5mm
5/32	1/8"
3/16	3.7mm
7/32	4.5mm
1/4	5.1mm
5/16	6.5mm

GLOW PLUG KNOW-HOW...

by MIKE CALLAGHAN

Internal combustion engines have always relied upon fuel being vaporised and ignited under pressure.

Various methods of igniting fuel vapours are in use including high compression, spark ignition and glowplugs. The high compression diesel engine is very effective, but suffers with poor low speed performance, and uneven throttling. Spark ignition overcomes these difficulties, but involves the weight penalty of the coil, condenser and battery or magneto. The glowplug however uses a battery or accumulator to generate the initial heat for starting the engine but, once started, the plug remains incandescent, or glows, with the current source disconnected. The glowplug ignition system was originally used before either the diesel or spark ignition came into general use.

The Wright brothers flew their own home built aero engine fitted with a type of glowplug, and this was only slightly different from the version that is used in the model world today.

The first modeller to realise the potential of the glowplug for the model use was the famous American engine manufacturer Ray Arden, who first employed the system in his own engines. This enabled modellers to dispense with the airborne spark generating system thus obtaining much better flight performance.

With the exception of a small number of diesel designs available the majority of engines produced today are glow motors, made in a variety of shapes and sizes. The modern glowplug is essentially as shown in Fig. 1 with a standard ¼" diameter body.

The wire element glows initially by the flow of current from a 1.5 volt battery (or 2 volt accumulator) and, once the engine starts, continues to glow when the current is disconnected. Current drain is high, approx. 2 to 5 amps being quite normal. For this reason it is not advisable to leave the battery any longer than is absolutely necessary, otherwise the battery and plug life will suffer. Either a 1.5 or a 2 volt plug may be used since the engine performance will not be affected.

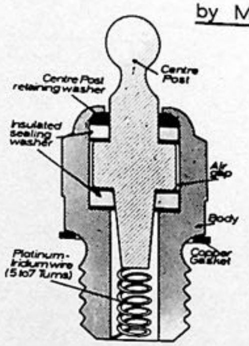

Centre Post retaining washer
Centre Post
Insulated sealing washer
Air gap
Body
Platinum-iridium wire (5 to 7 Turns)
Copper Gasket

Fig. 1
Sectional view of typical glow plug construction. Centre post is always insulated from body.

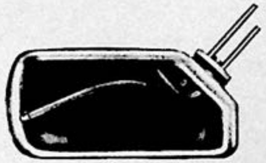
Naturally, however, a well charged accumulator giving 2 volts will probably blow a 1.5 volt plug unless a resistance of about 0.25 ohms is included in the circuit. (Frequently provided by a long lead from the accumulator to the plug clip.) The heat range of a plug is controlled by the dimensions and therefore the conductivity of the centre post and wire element. For an engine running on a high nitromethane content fuel, say 20% or more, a cool plug will be required, the construction of a cool plug being designed to withstand the higher temperatures created by the oxygen producing nitromethane. Conversely, an engine running on straight fuel (with no nitro content) will require a hot plug.

Many factors affect the best choice of glowplug including compression ratio, fuel mixture, and even weather conditions will have their influence. In practice it is advisable to try a variety of plugs in each individual engine to obtain peak performance - you will be surprised at the difference.

Check the various glow plug types in this Handbook- DC - FIREBALL - HOTSPOT - MERCO - WANKEL - KAVAN.

..NEW SCHUCO ITEMS

216 430



217 902

Useful accessories from Schuco - a tough NYLON engine mount to suit .06 to .12 (1 to 2 cc) glow or diesel engines, and a range of six NEW SLANT KLUNK TANKS for aircraft or marine models.

SCHUCO-HEGI ENGINE ACCESSORIES

L-U216/430	.06-.12 Nylon Engine Mount
L-U217/902	40cc Slant Klunk Tank
L-U217/903	100cc " " "
L-U217/904	150cc " " "
L-U217/905	250cc " " "
L-U217/906	400cc " " "
L-U217/907	500cc " " "

Fireball GLOW PLUGS

HOT (RED) for fast starts in any weather
1.2 to 3 volts.
Long Reach L-FG21 Short Reach L-FG22

STANDARD (YELLOW) for all engines and all types of flying. 1.2 to 2 volts.
Long Reach L-FG31 Short Reach L-FG32

COOL (BLUE) for higher compression engines, and/or hot fuels. 1.2 or 1.5 volts
Long Reach L-FG41 Short Reach L-FG42

ELECTRIC MOTORS

Leading details of the RIPMAX range of electric motors are summarised in this table. These include level straight drive and geared motors. Where no entry is given in the column GEARING, the motor is a straight drive type.

Motor ratings are given according to manufacturers specifications - i.e. volts (or design operating voltage) and NO LOAD RPM, or free running speed. Current figures are not given since these will depend on load.

WATTAGE of a motor is a nominal rating for power and is based on a typical load current with the motor operated on its design voltage (as listed in the volts column). As a very rough guide (since actual power output will also depend on motor efficiency), the following may be taken as wattage/horsepower equivalents.

Rating (watts)	Power (HP)
1 watt	1/1000
2 watts	1/500
4 "	1/250
5 "	1/200
10 "	1/100
20 "	1/50

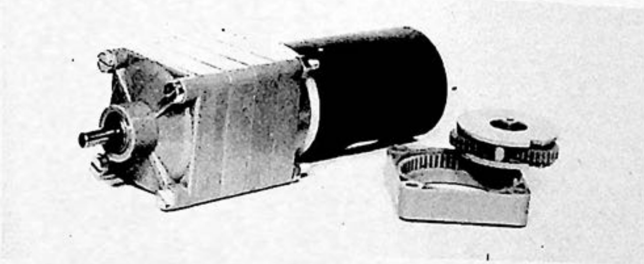
The electric motors shown are listed in groups representing different manufacturers. Further details of included motors are given in the following pages, together with accessories, spares, etc. (e.g. brush gear, where replaceable). Consult these separate descriptions for details of the type of gearing involved, (where applicable).

Complete motor/drive units for marine use - i.e. outboards and inboard-outboard power units - are not included in this table and are described separately.

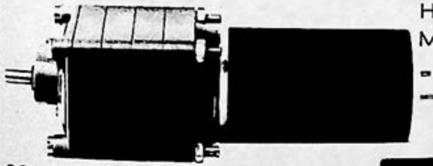
MOTOR	VOLTS	LENGTH	DIA or WIDTH	HEIGHT	SHAFT DIA	WEIGHT	NO LOAD RPM	GEARING	CAT NO	MOTOR
Orbit 005	1½-3	1"	13/16"	13/16"	2mm	5/8 oz	10,000	-	M-EM005	Orbit 005
Orbit 105	1½-3	1 1/8"	13/16"	13/16"	2mm	7/8 oz	9,000	-	M-EM105	Orbit 105
Orbit 205	1½-3	1 1/8"	1"	1"	2mm	1 1/8oz	9,000	-	M-EM205	Orbit 205
Orbit 305	1½-3	1 1/4"	1"	1"	2.3mm	1 3/8oz	6,500	-	M-EM305	Orbit 305
Orbit 405	1½-6	1 1/4"	1 1/4"	1 1/4"	2.3mm	1 7/8oz	10,500	-	M-EM405	Orbit 405
Orbit 505	1½-6	1 3/8"	1 1/4"	1 1/4"	2.3mm	2 3/8oz	9,000	-	M-EM505	Orbit 505
Orbit 605	4½-6	2"	1 3/8"	1 3/8"	1/8"	3 1/4oz	9,000	-	M-EM605	Orbit 605
Orbit 705	4-8	2"	1 3/8"	1 3/8"	1/8"	5 oz	7,000	-	M-EM705	Orbit 705
Orbit 805	6-12	2 3/8"	1 3/4"	1 3/4"	4mm	9 1/4oz	9,000	-	M-EM805	Orbit 805
Atom	1½-3	1 1/4"	13/16"	5/8"	2mm	1 oz	11,000	-	M-EM10	Atom
Micromax TO3	2-4	3/4"	3/4"	3/4"	2mm	7/8 oz	330	60:1	M-G1722	Micromax TO3
Micromax TO3	2-4	3/4"	3/4"	3/4"	2mm	7/8 oz	1,200	15:1	M-G1725	Micromax TO3
Micromax TO5	2	5/8"	5/8"	5/8"	complete with pinion	1/2 oz	18,000	-	M-G1726	Micromax TO5
Micromax TO5	2	11/16"	5/8"	5/8"	2mm	1/8 oz	410	41:1	M-G1726/41	Micromax TO5
Micromax TO5	2	11/16"	5/8"	5/8"	2mm	3/16oz	128	141:1	M-G1726/141	Micromax TO5
Micromax TO5	2	3/4"	5/8"	5/8"	2mm	1/4 oz	37	485:1	M-G1726/485	Micromax TO5
Jumbo 2000	6	2 1/2"	1 3/8"	1 3/8"	2mm	5 oz	8,000	-	M-G1739	Jumbo 2000
Jumbo 2000F	12	3 1/2"	1 3/8"	1 3/8"	4mm	6½ oz	2,000	5:1	M-G1770	Jumbo 2000F
Monoperm Super	6	46mm	30mm	30mm	2mm	90 gms	6,000	3,6,12,16, 32 or 60:1	M-EM41	Monoperm Super
Richard I	6	87mm	40mm	47mm	4mm	57 gms	8,000	3,6,12,16, 32 or 60:1	M-EM51	Richard I
Richard II	6	97mm	40mm	47mm	4mm	5 3/8 oz	6,000	3,6,12,16, 32 or 60:1	M-EM52	Richard II
Mini Richard	6	37mm	37mm	25mm	2mm	5/8 oz	6,000	3,6,12,16, 32 or 60:1	M-EM56	Mini Richard
Microperm Spl	2-6	26mm	17mm	21mm	1.5mm	16 gms	13,000	-	M-EM130/1	Microperm Spl
Milliperm Spl	6	34mm	21mm	28mm	1.5mm	26 gms	10,000	-	M-EM136	Milliperm Spl
Monoperm Spl	6	40mm	30mm	30mm	2mm	75 gms	11,000	-	M-EM139	Monoperm Spl
Monoperm S/Spl	6	52mm	30mm	30mm	2mm	120 gms	8,000	-	M-EM141	Monoperm S/Spl
Decaperm Spl	6	62mm	44mm	55mm	4mm	370 gms	3,000 geared	2,75:1	M-EM145G	Decaperm Spl
Hectoperm Spl	6	65mm	52mm	52mm	4mm	600 gms	6,000	2:1	M-EM146G	Hectoperm Spl
Milliperm S/Pile	6	70mm	24mm	24mm	3mm	70 gms	10,000 rpm ÷ by gears	3:1 to 360:1	M-EM136P	Milliperm S/Pile
Monoperm S/Pile	6	121mm	36mm	50mm	4mm	95 gms	11,000 rpm ÷ by gears	3:1 to 360:1	M-EM141P	Monoperm S/Pile
Decaperm S/Pile	6	169.5mm	52mm	52mm	6mm	420gms	9,000 rpm ÷ by gears	3:1 to 360:1	M-EM145P	Decaperm S/Pile
Hectoperm S/Pile	6	181.5mm	52mm	52mm	6mm	710gms	6,000 ÷ by gears	3:1 to 360:1	M-EM146P	Hectoperm S/Pile
Target	6-12	1 1/2"	1 5/8"	2 5/8"	3/32"	8 oz	6,000	-	M-EM81	Target
Meteor	6-12	1 3/4"	1 5/8"	2 5/8"	3/32"	12 oz	6,500	-	M-EM84	Meteor
Standard	6-12	3"	1 5/8"	2 5/8"	3/16"	18 oz	10,000	-	M-EM86	Standard
Supermarine	6-12	3"	4 1/8"	2 1/4"	1/4"	32 oz	4,500	-	M-EM87	Supermarine
D/Supermarine Spl	6-12	3"	4 1/8"	2 1/4"	1/4"	40 oz	10,000	-	M-EM89	D/Supermarine Spl

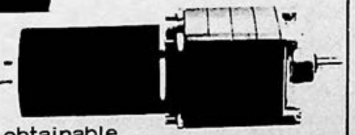
EARING	CAT NO	MOTOR
-	M-EM005	Orbit 005
-	M-EM105	Orbit 105
-	M-EM205	Orbit 205
-	M-EM305	Orbit 305
-	M-EM405	Orbit 405
-	M-EM505	Orbit 505
-	M-EM605	Orbit 605
-	M-EM705	Orbit 705
-	M-EM805	Orbit 805
-	M-EM10	Atom
60:1	M-G1722	Micromax T03
15:1	M-G1725	Micromax T03
-	M-G1726	Micromax T05
41:1	M-G1726/41	Micromax T05
141:1	M-G1726/141	Micromax T05
485:1	M-G1726/485	Micromax T05
-	M-G1739	Jumbo 2000
5:1	M-G1770	Jumbo 2000F
3,6,12,16, 32 or 60:1	M-EM41	Monoperm Sup - -
3,6,12,16, 32 or 60:1	M-EM51	Richard I
3,6,12,16, 32 or 60:1	M-EM52	Richard II
3,6,12,16, 32 or 60:1	M-EM56	Mini Richard
-	M-EM130/1	Microperm Spl
-	M-EM136	Milliperm Spl
-	M-EM139	Monoperm Spl
-	M-EM141	Monoperm S/S
2,75:1	M-EM145G	Decaperm Spl
2:1	M-EM146G	Hectoperm Spl
3:1 to 360:1	M-EM136P	Milliperm S/P
3:1 to 360:1	M-EM141P	Monoperm S/P
3:1 to 360:1	M-EM145P	Decaperm S/P
3:1 to 360:1	M-EM146P	Hectoperm S/P
-	M-EM81	Target
-	M-EM84	Meteor
-	M-EM86	Standard
-	M-EM87	Supermarine
-	M-EM89	D/Supermarine S
-		

MARX LUDER TAYCOL ELECTRIC MOTORS

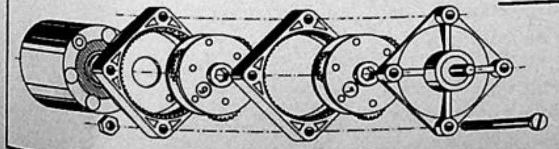


PILE GEARED MOTORS ...... A PILE is a very special form of miniature gearbox incorporating low friction, high-efficiency epicyclic gearing. Reduction ratios available are 3:1, 4:1, 5:1 and 6:1. These can be used in any combination to produce reduction ratios of up to 360:1. If even higher ratios are required, additional pile stages can be added. Pile gearboxes are of all-plastic construction which require no additional lubrication or maintenance of any kind. They are assembled as a 'stack' of 1, 2, 3, 4 (or more) stages, bolting directly onto the end of the motor. In three sizes - MINI, STANDARD and MAXI, fitted to the following LUDER MOTORS:- Milliperm Special with Mini-Pile - M-EM136P, Monoperm Special with Standard Pile - M-EM141P. Decaperm Special with Maxi-Pile - M-EM145P Hectoperm Special with Maxi-Pile - M-EM146P

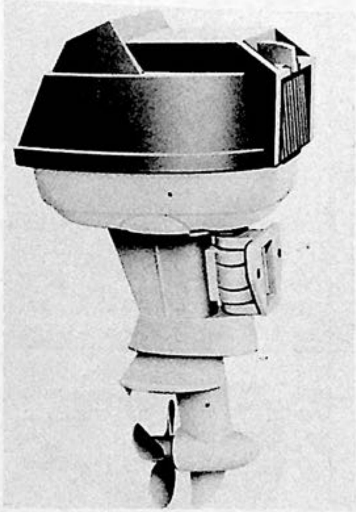




COMPLEMENTARY SETS
Additional PILE stages, known as COMPLEMENTARY SETS, are available to extend the ratios obtainable from the MILLIPERM SPECIAL, MINI-PILE, or MONOPERM SPECIAL PILE motors.



COMPLEMENTARY SETS
MINI PILE
M-EM136P/1
PILE
M-EM141P/1

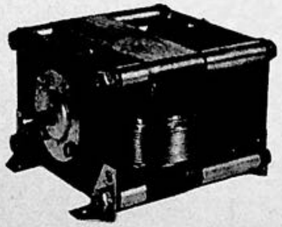


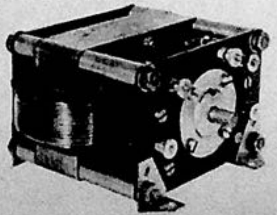
NEPTUNE SUPER cat no - M-EM250
High performance 4½ volt electric powered outboard motor complete with transom mount. 1" diameter three blade propeller. Approx. 4½" high. Weight 3 ozs.

'Z' DRIVE

The NEW coupled motor-propeller drive for transom mounting. Full pivot (360 degrees) steering. Rake adjustment through 45 degrees. This powerful unit fits through a 16mm diameter hole in the transom. 4½-6 volt, 8 watt motor powering 3-blade prop through Z-drive unit. 3" long internally. Outdrive depth 3¼". Overhung length 1½". Weight (complete with motor) 5 oz. Cat no M-EM251.

MARX LUDER ACCESSORIES
SUPPRESSION RING
M-EM281 Milliperm Special
M-EM282 Monoperm Special
M-EM283 Deca/Hecto Special
PUSHFIT TERMINAL
M-EM291 Milliperm Special (Pkt 6)
M-EM292 Mono Special (Pkt 6)
M-EM293 Deca/Hecto Special (6)

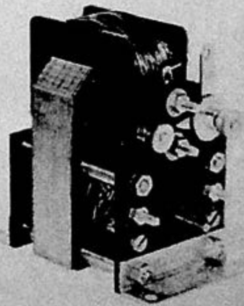




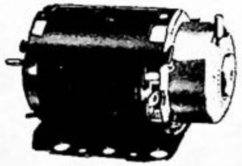
"TAYCOL" MOTORS

High power FIELD WOUND motors with heavy duty commutator, replaceable copper braid brushes, adjustable brush pressure. 6 - 12 volt working.

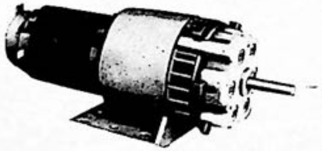
Target M-EM81 Standard M-EM86
Meteor M-EM84 Supermarine M-EM87
Double Supermarine Special M-EM89
BRUSH SETS -
for Target and Meteor M-EM81/1
for Standard M-EM86/1
for S/Marine & Double M-EM87/1



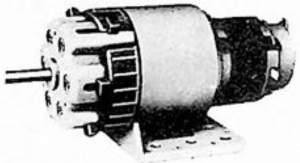
MARX LUDER
GRAUPNER ELECTRIC MOTORS



MONOPERM SUPER High quality 6 volt motor. Dia 30mm length 100mm. Wt. 150 grams. Fitted with integral base mount and on-off switch. M-EM41.



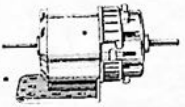
RICHARD I Monoperm motor mounted on RICHARD gearbox giving a choice of six gear ratios 3:1, 6:1, 12:1, 16:1, 32:1 or 60:1. Cat no M-EM51.

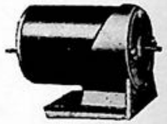


RICHARD II Monoperm super motor mounted integrally with six speed RICHARD GEARBOX (3:1, 6:1, 12:1, 16:1, 32:1 or 60:1 ratios) Cat no M-EM52.

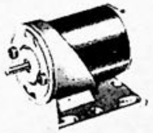
MINI-RICHARD A miniaturised version of the RICHARD gearbox fitted to a milliperm motor. Fingertip selection of any of the six ratios. Cat no M-EM56.

RICHARD GEARBOXES ONLY
Richard cat no M-EM50
Mini Richard cat no M-EM55.

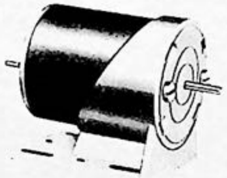




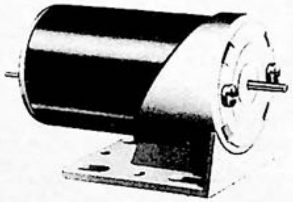
MICROPERM SPECIAL Up to 12,000 rpm. 5-pole armature motor. Dia 17mm Length 26mm Base 21 x 26mm. Wt. 16 gr. (2v) M-EM130 (6v) M-EM131.



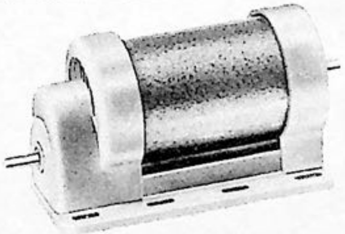
MILLIPERM SPECIAL 5-pole armature with new improved brushgear. Dia 21mm Length 34mm. Shaft 1.5mm. Base mt. 25 x 35mm. Wt. 35 gr. 6 volts Cat no M-EM136.



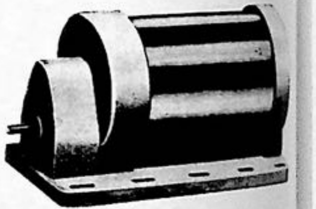
MONOPERM SPECIAL Rugged reliable 6 volt motor. Dia 30mm Length 40mm. Shaft 2mm. Base mount 40 x 53mm. M-EM139.



MONOPERM S/SPECIAL Super-power design with 5-pole armature. Weight 120 gr. Cat no M-EM141.



DECAPERM SPECIAL A superb 20 watt motor with built-in $2\frac{3}{4}:1$ reduction gearbox. Wt. 340 gr. Cat no M-EM145G.



HECTOPERM SPECIAL 6 volt 30 watt motor (75% efficiency) with built-in 2:1 reduction. Wt. 600 gr. ($22\frac{1}{2}$oz) M-EM145

Graupner TO motors

Precision miniature motors - suitable as servo motors, etc. The TO3 is 20mm dia x 22mm long.

TO3 geared 60:1, $1\frac{1}{2}$-3 v cat no M-G1722

TO3 geared 15:1, 2-4 v cat no M-G1725

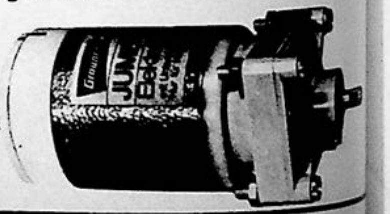
The TO5 is even smaller (15mm dia x 19mm long). MICROMAX TO5 cat no M-G1726

GEARBOXES
41:1 cat no M-G1726/41
141:1 cat no M-G1726/141
485:1 cat no M-G1726/485

JUMBO motors

A very high efficiency high power electric motor from Graupner with balanced 5-pole armature, special heavy duty brush gear and commutator - designed for long life under heavy duty applications (35mm dia, 30mm long, 133 grams weight). Available in two versions; straightdrive (6 volt working) for marine power units, and as a 12 volt version with reduction gearbox for electric powered aircraft - e.g. the Graupner Hi-Fly.

JUMBO 2000 (6v) cat no M-G1739
JUMBO 2000F (12v) cat no M-G1770

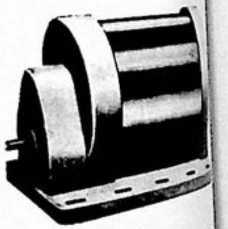


Electric Motor Suppressor Unit cat no M-G3534

RIPM
ORBIT

ORBIT 005
Smallest m
$\frac{1}{2}$ ounce (a
for experime
a low-cost
ORBIT 105
Designed fo
Size 1 1/8"
ORBIT 205
Size 1 1/8"
approximate
fast motor f
ORBIT 305
Size $1\frac{1}{4}$" x
Free running
220 milliam
hulls 14 -
ORBIT 405
Size 1 3/8"
Suitable for

MICROPERM SPECIAL Up t
12,000 rpm. 5-pole armatu
motor. Dia 17mm Length 26m
Base 21 x 26mm. Wt. 16 g
(2v) M-EM130 (6v) M-EM1



uperb
$2\frac{3}{4}$:1
) gr.

HECTOPERM SPECIAL
30 watt motor (75% efficie
with built-in 2:1 reducti
Wt. 600 gr. ($22\frac{1}{2}$oz) M-EM

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for long life
30mm long,
straightdrive
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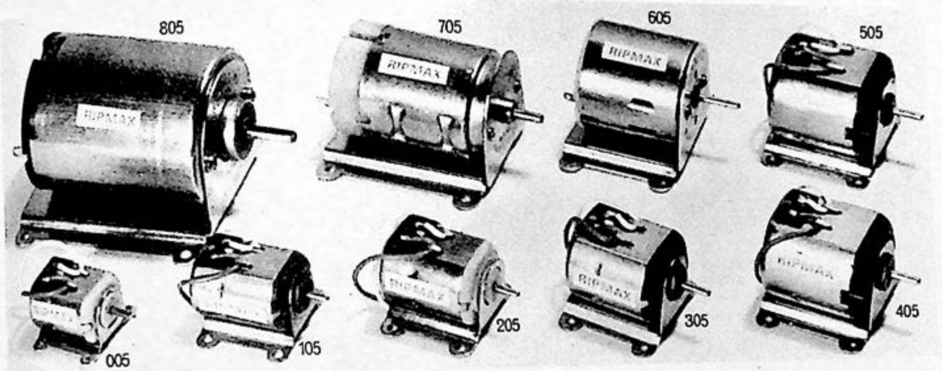
RIPMAX, ORBIT, GRAUPNER ELECTRIC MOTORS



RIPMAX ORBIT

A range of low cost Japanese-made motors of compact design and powerful performance. Totally enclosed construction with twin sintered high-permeability magnets and removable mounting plate. Models 005 to 505 inclusive feature replaceable nylon-mounted brushes.

ORBIT 005 cat no M-EM005 ($1\frac{1}{2}$ - 3v)
Smallest model in the range weighs only $\frac{1}{2}$ ounce (approximately) and is ideal for experimental installations that require a low-cost sub-miniature motor.

ORBIT 105 cat no M-EM105
Designed for operating on $1\frac{1}{2}$ - 3 volts. Size 1 1/8" x 7/8". Weight $\frac{3}{4}$ ounce.

ORBIT 205 cat no M-EM205 ($1\frac{1}{2}$ - 3v)
Size 1 1/8" x 1". Weight 1 ounce approximately. A high revving and very fast motor for its size.

ORBIT 305 cat no M-EM305 ($1\frac{1}{2}$ - 3v)
Size $1\frac{1}{4}$" x 1 1/16". Weight $1\frac{1}{4}$ ounces. Free running, speed 8000 rpm drawing 220 milliamps. Suitable for powering hulls 14 - 22" long.

ORBIT 405 cat no M-EM405 (3 - 6v)
Size 1 3/8" x 1 1/8". Weight $1\frac{3}{4}$ ounces. Suitable for powering hulls 16-24" long.

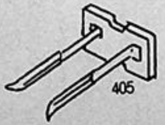
ORBIT 505 cat no M-EM505 (3 - 6v)
Size $1\frac{1}{2}$" x $1\frac{1}{4}$". Weight $2\frac{1}{4}$ ounces. Suitable for powering hulls 18-30" long.

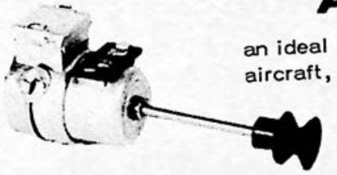
ORBIT 605 cat no M-EM605
A more rugged design with uprated armature, uprated brushgear and generally heavier construction throughout. Designed for $4\frac{1}{2}$ - 6 volt working.

ORBIT 705 cat no M-EM705 ($4\frac{1}{2}$ - 6v)
Light industrial type motor with high-efficiency armature and specially developed long-lasting brush gear. Suitable for powering hulls 24-42" long.

ORBIT 805 cat no M-EM805 ($4\frac{1}{2}$ - 6v)
Low cost heavy duty motor specially developed for model boats and other propulsion duties. Rugged, efficient design with industrial-type brushgear. For powering hulls up to 48" long.

BRUSH SETS:
M-EM005/1 for ORBIT 005 & 105
M-EM205/1 for ORBIT 205 & 305
M-EM405/1 for ORBIT 405 & 505





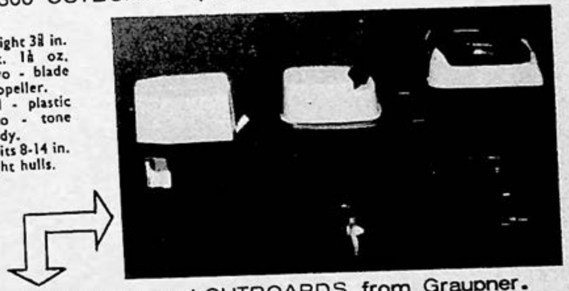
ATOM

$1\frac{1}{2}$ - 3 volt MOTOR
Only 1" long by 11/16" diameter - an ideal choice for motorising plastic aircraft, boat or car kits. Weight $\frac{1}{2}$ oz. Free running speed 11000 rpm. Shaft diameter .080". Complete with pulley (easily detachable if not needed). Cat no M-EM10.

SUBMARINE POWER UNIT - cat no M-EM3
A COMPLETE power unit for attaching directly to the bottom of a small hull. Features fully enclosed electric motor and battery box in waterproof casing, propeller and adjustable rudder. Length 5". Weight 1.8 ounces.

OB300 OUTBOARD (photo left) Cat no M-EM300

Height $3\frac{3}{8}$ in.
Wt. $1\frac{3}{8}$ oz.
Two - blade propeller.
All - plastic two - tone body.
Suits 8-14 in. light hulls.



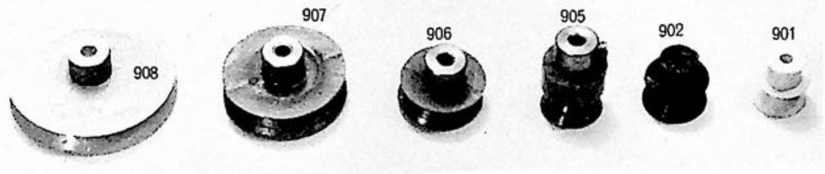
A range of three battery-powered OUTBOARDS from Graupner. Each is complete with transom bracket, ready to install on any suitable hull. Efficient drive ensures good thrust and moderate battery drain.

EVINRUDE TYPE - Size 73 x 47 x 130mm. Weight 100 gr. For batteries of up to 6 volts. Cat no M-G1719

REX OUTBOARD - Size 60 x 37 x 112mm. Weight 47 gr. For $1\frac{1}{2}$ volt batteries. Cat no M-G1721.

JOHNSON TYPE - Size 62 x 37 x 113mm. Weight 88 gr. For 3 or $4\frac{1}{2}$ volt batteries. Cat no M-G1750.

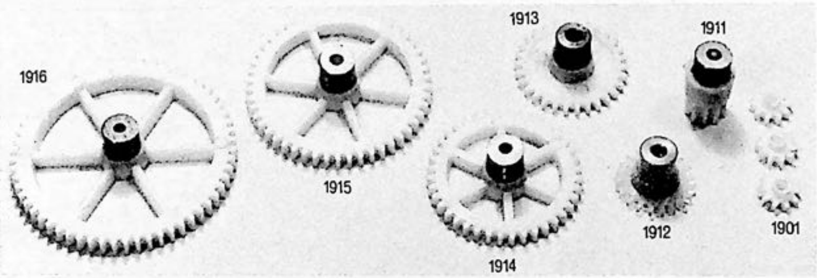
PULLEYS AND GEARS BATTERIES



RIPMAX NYLON PULLEY WHEELS 3/32" BORE

Precision-moulded nylon with true pulley groove and true 'wheel' diameter. In two versions - push-fit onto a 3/32" shaft; and with integral brass hub to fit 3/32" dia. shafting. Colour coded for identification.

	PUSH FIT PULLEY
N-901	5/16" dia
N-902	3/8" dia
	BRASS HUB PULLEY
N-905	3/8" dia
N-906	1/2" dia
N-907	3/4" dia
N-908	1" dia



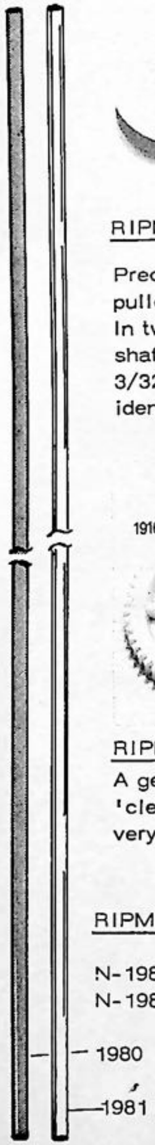
RIPMAX NYLON GEAR WHEELS 3/32" BORE

A gear is as good as its tooth form and 'clearance' relief - and these gears rate very highly for efficiency and matching.

	PUSH FIT GEAR
N-1901	3/8" dia 10 Tooth
	BRASS HUB GEAR
N-1911	3/8" dia 10 Tooth
N-1912	9/16" dia 20 Tooth
N-1913	13/16 dia 30 Tooth
N-1914	1" dia 40 Tooth
N-1915	1¼" dia 50 Tooth
N-1916	1½" dia 60 Tooth

RIPMAX 3/32" SHAFTING

N-1980	Brass Shafting 12" straight length
N-1981	Steel Shafting 12" straight length

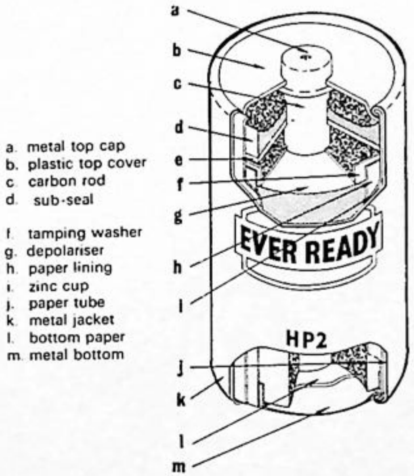


RIPMAX WORM & WHEEL SETS 3/32" BORE

N-1931	1/4" Push Fit Worm & 3/4" Wheel 40:1
N-1941	3/8" Brass Hub Worm & 3/4" Wheel 36:1

DRY BATTERIES

Illustration shows the construction of a High Power (HP) dry cell.



EVER READY DRY BATTERIES

SUPER GENERAL PURPOSE

O-ER/SP2	1½v
O-ER/SP11	1½v

HIGH POWER BATTERIES

O-ER/HP2	1½v
O-ER/HP7	1½v
O-ER/HP11	1½v

HIGH CURRENT BATTERIES

O-ER/AD4	1½v
O-ER/AD35	1½v

BELL BATTERY

O-ER/126	4½v

POCKET LAMP BATTERY

O-ER/1289	4½v

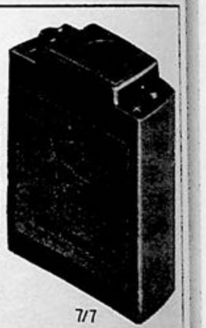
TRANSISTOR BATTERIES

O-ER/PP1	6v	O-ER/PP3	9v
O-ER/PP4	9v	O-ER/PP6	9v
O-ER/PP7	9v	O-ER/PP9	9v

VARLEY LEAD-ACID ACCUMULATORS are of the 'dry' non-spill type, with plates and separators assembled under compression to form a solid porous block of high activity. No danger of plate buckling and shedding during service. No free electrolyte. Vibration proof.

Varley

7/4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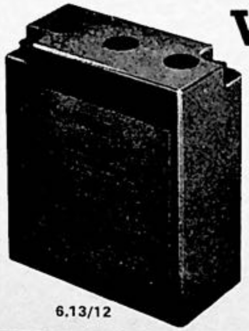
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Cat No	Volts	Amp/ Hrs.	Length	Width	Height	Weight (oz)
O-VPT7/4	2	4.0	3.2"	1.3"	2.5"	11.0
O-VPT7/7	2	7.0	3.2"	1.3"	3.5"	16.5
O-VPT7/9	2	9.5	3.2"	1.3"	4.5"	21.5
O-RV20	2	12.0	3" diameter		4.6"	44.0
O-RV40	2	25.0	3" diameter		5.7"	59.0
O-V613/12	6	12.0	4.9"	2.4"	5.2"	80.0

DEACS ACCUMULATORS

RIPMAX have also selected three other makes of LEAD-ACID ACCUMULATORS as ideally suited to modelling applications ... EXIDE ... DRYFIT ... and MATSUSHITA.

EXIDE BATTERIES are of the unspillable type with 'wet' electrolyte. The two sizes chosen provide a generous ampere-hour capacity at modest size and weight and are particularly suitable for 'heavy duty' electric motor applications.

DRYFIT accumulators are of German manufacture and are of the sealed type. This makes them particularly suitable for use where complete freedom from corrosion is required (e.g. as a transmitter battery).

MATSUSHITA accumulators are of Japanese manufacture, and another 'unspillable' type. The 6 volt model is particularly attractive as a model boat motor battery, giving 6 volts and 4 amp-hr capacity at only 19 ounces weight. The 2 volt model is an ideal high-capacity battery for glow-plugs - and again another lightweight type. Prices of both MATSUSHITA accumulators are most attractive, too - making them a 'BEST BUY' for many modelling applications.

EXIDE LEAD-ACID UNSPILLABLE ACCUMULATORS

O-MFB9	2v	8.0Ah	21.0oz	3.2" × 1.3" × 4.3" ht
O-3MFB7	6v	6.0Ah	48.0oz	3.2" × 3.2" × 4.0" ht

DRYFIT LEAD-ACID SEALED ACCUMULATORS

O-G3690(3AX2/F)	6v	0.9Ah	9.5oz	2.0" × 1.7" × 2.0" ht
O-G3674(3GX3/F)	6v	2.6Ah	21.0oz	5.3" × 1.3" × 2.3" ht

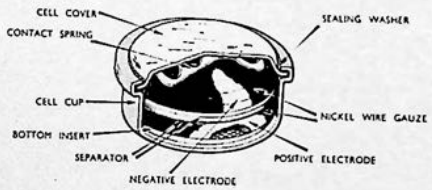
MATSUSHITA LEAD-ACID LIGHTWEIGHT ACCUMULATORS

O-KM28	2v	8.0Ah	25.0oz	2.6" × 1.8" × 4.4" ht
O-KM64	6v	4.0Ah	19.0oz	3.6" × 1.7" × 2.4" ht

DEACS ...

Nickel-cadmium rechargable batteries are the standard choice for radio control work. The two main sizes of 'button' cells are 225 (0.225 amp-hr capacity) and 500 (0.5 amp-hr).

'225' cells are 1" dia and 0.36" thick. '500' cells are 1.35" dia and 0.39" thick. Each cell gives 1.2 volts. Batteries are made up by welding two or more cells together.



SOLDER TAG TERMINALS AND TAPPED ALL CELLS

O-D2/225TT	2.4v	0.23Ah	1.0oz
O-D3/225TT	3.6v	0.23Ah	1.5oz
O-D4/225TT	4.8v	0.23Ah	2.0oz
O-D5/225TT	6.0v	0.23Ah	2.5oz
O-D6/225TT	7.2v	0.23Ah	3.0oz
O-D2/500TT	2.4v	0.50Ah	2.0oz
O-D3/500TT	3.6v	0.50Ah	3.0oz
O-D4/500TT	4.8v	0.50Ah	4.0oz
O-D5/500TT	6.0v	0.50Ah	5.0oz
O-D6/500TT	7.2v	0.50Ah	6.0oz
O-D7/500TT	8.4v	0.50Ah	7.0oz
O-D8/500TT	9.6v	0.50Ah	8.0oz
O-D10/500TT	12 v	0.50Ah	10.0oz
O-D1/1000TT	1.2v	1.00Ah	2.0oz
O-D2/1000TT	2.4v	1.00Ah	4.0oz
O-D3/1000TT	3.6v	1.00Ah	6.0oz
O-D4/1000TT	4.8v	1.00Ah	8.0oz
O-D5/1000TT	6.0v	1.00Ah	10.0oz
O-D6/1000TT	7.2v	1.00Ah	12.0oz

SOLDER TAG TERMINALS WITH SELECTED TAPPINGS

O-D1/225T	1.2v	0.23Ah	0.5oz
O-D2/225T	2.4v	0.23Ah	1.0oz
O-D3/225T	3.6v	0.23Ah	1.5oz
O-D4/225T *	4.8v	0.23Ah	2.0oz
O-D5/225T *	6.0v	0.23Ah	2.5oz
O-D6/225T *	7.2v	0.23Ah	3.0oz
O-D1/500T	1.2v	0.50Ah	1.0oz
O-D2/500T	2.4v	0.50Ah	2.0oz
O-D3/500T	3.6v	0.50Ah	3.0oz
O-D4/500T *	4.8v	0.50Ah	4.0oz
O-D5/500T *	6.0v	0.50Ah	5.0oz
O-D6/500T *	7.2v	0.50Ah	6.0oz

* 4.8v batteries are tapped at 2.4v; 6.0v batteries are tapped at 1.2 and 3.6v; 7.2v batteries are tapped at 3.6v.

PRESS STUD TERMINALS WITH SELECTED TAPPINGS

O-D1/225P	1.2v	0.23Ah	0.5oz
O-D2/225P	2.4v	0.23Ah	1.0oz
O-D3/225P	3.6v	0.23Ah	1.5oz
O-D4/225P *	4.8v	0.23Ah	2.0oz
O-D5/225P *	6.0v	0.23Ah	2.5oz
O-D6/225P *	7.2v	0.23Ah	3.0oz
O-D1/500P	1.2v	0.50Ah	1.0oz
O-D2/500P	2.4v	0.50Ah	2.0oz
O-D3/500P	3.6v	0.50Ah	3.0oz
O-D4/500P *	4.8v	0.50Ah	4.0oz
O-D5/500P *	6.0v	0.50Ah	5.0oz
O-D6/500P *	7.2v	0.50Ah	6.0oz

* 4.8v batteries are tapped at 2.4v; 6.0v batteries are tapped at 1.2 and 3.6v; 7.2v batteries are tapped at 3.6v.

BATTERY CHARGING...

As a general guide a suitable charging current for most accumulators is 1/10th of the ampere-hour capacity - e.g. for a 5 amp-hr capacity accumulator charge at 5 ÷ 10 = 0.5 amps. This applies both to DEACS and lead-acid batteries, and would give a full charge (battery completely discharged to start with) in about 14 hours.

Most lead-acid accumulators have 'recommended' charging rates which may differ from these figures. You will find these printed on the battery. For example, with a 5 amp-hr EXIDE battery the recommended charging rate is 0.3 amps. For the 4 amp-hr MATSUSHITA battery the recommended charging current is 0.5 amps.

No harm will result by charging at slightly higher than 'recommended' rates - and this can be more convenient if you are in a hurry. Thus 0.6 amps is a good general charging current for all types and sizes of lead-acid accumulators. With larger batteries, a charging current of 1 amp can be used safely.

RIPMAX CHARGERS are high-rate type, specially designed for charging lead-acid accumulators. Choose the 2-volt CHARGER for glow plug batteries. The 6-volt CHARGER is particularly recommended for recharging the 6 volt MATSUSHITA accumulator. The 2-4-6 CHARGER gives you more flexibility, offering you charging rates of either 0.5 or 1 amp at 2 volts, 4 volts or 6 volts.

The GRAUPNER MULTICHARGER gives you an even wider range of charging duties. Five rates for charging all sizes of DEAC batteries from 1.2 to 12 volts. Lead-acid accumulators can be charged at 100 milliamps or 500 milliamps - matched to battery sizes of 2,4,6 or 12 volts.

If necessary, up to five batteries can be charged simultaneously with the GRAUPNER MULTICHARGER in the 10,22, 2 x 50 and 100 milliamp ranges - very useful for recharging a batch of DEACs!

DEACS should ALWAYS BE CHARGED AT THE RATE OF 1/10TH THE CAPACITY. It is impossible to estimate or measure the state of discharge but a 100 per cent 'over-charge' is quite safe. In other words, no harm will result if a partly discharged DEAC is recharged for 10 to 14 hours - AT RECOMMENDED RATE.

The state of a lead-acid battery can be estimated from its voltage. Over 2.1 volts indicates a fully charged cell. 2.04 to 2.08 volts, a half discharged cell. 1.9 volts or under, a discharged cell.

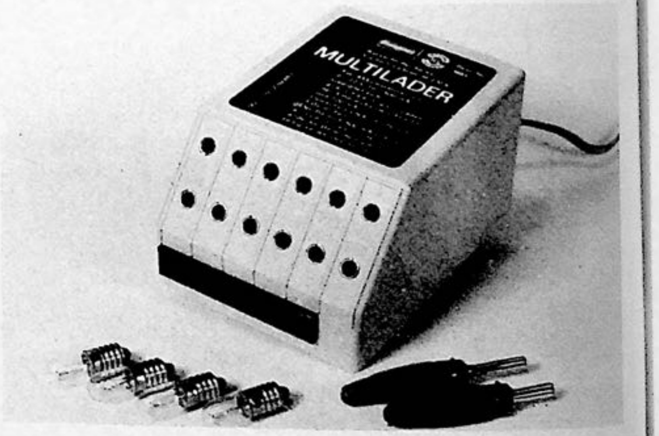
Certain precautions apply when recharging lead-acid accumulators. Open all vent plugs. Keep naked lights - and cigarettes! - away from a charging battery as hydrogen is given off.

Check, too, the topping-up procedure recommended for the particular battery (read the instruction leaflet, or the label on the battery). For the INITIAL CHARGE of a brand new battery, again follow the maker's instructions. The MATSUSHITA, for example is supplied 'dry' and needs filling with battery acid (obtainable from any garage). This is then followed by an initial FORMING CHARGE for 30 hours at 0.5 amps.

In service, grease battery terminals with Vaseline to prevent corrosion developing. Keep battery cases clean and dry. Never leave a lead-acid battery in a discharged state. If not required for use for several weeks, recharge before storage and give a 'refresher' charge at least once a month.

ACCUMULATOR CHARGERS

	RIPMAX
O-CH2	2-volt Charger (1.0 amp)
O-CH6	6-volt Charger (0.6 amp)
O-CH246	2-4-6-volt Charger (0.5 & 1.0 amp)



O-G3685	Graupner Multicharger
O-G3530	Deluxe Plugs for Multicharger (set 2)
O-G3685/3A	Spare 10mA Charging Bulb
O-G3685/3B	Spare 22mA Charging Bulb
O-G3685/3C	Spare 50mA Charging Bulb
O-G3685/3D	Spare 100mA Charging Bulb

RIPMAX
2-volt Charger (1.0 amp)
6-volt Charger (0.6 amp)
2-4-6-volt Charger (0.5 & 1.0 amp)

Graupner Multicharger
Deluxe Plugs for Multicharger (se
/3A Spare 10mA Charging Bulb
/3B Spare 22mA Charging Bulb
/3C Spare 50mA Charging Bulb
/3D Spare 100mA Charging Bulb

R/C MODELS...

by TONY DOWDESWELL
(Editor Radio Control Models & Electronics)

So you want to start radio control! Many people do these days, but the problem of a painless introduction to the hobby is a thorny one and for every would-be R/C'r who successfully negotiates the 'learning curve', many just give up.

By modelling standards, radio control is by far the most expensive category, yet does, of course, offer the most realistic form of model operation. However, in terms of other adult participation pastimes, like golf, the initial investment and subsequent recurring expenditure are not excessive. The important point about the modelling hobbies, including radio control, is that these are all 'total commitment' pastimes - you're completely involved. This, I often think, is at least one reason why the British Public tend to ignore our hobby. It seems to me that we tend to be a nation of spectators, unwilling to risk the embarrassment that active participation in an activity sometimes produces - we, the British, are the original sporting amateurs, happier to lose in the maintenance of our amateur status rather than win by really appearing to try! Consequently, someone who not only actively participates in an activity, but actually succeeds, becomes an object of suspicion!

However, having decided to become one of the misunderstood elite, how do you get started? Well, you could do it entirely on your own - people, a very, very few people, have been known to teach themselves entirely on their own and achieve success.

So how do you get yourself 'in'. Accept first that you are going to require active assistance - modelling, R/C modelling, is very much a word of mouth learning process. Your best source of contact is your friendly model shop proprietor who can usually offer you advice and/or put you in touch with the nearest active modelling club or group. Many model shops tend to foster links with modelling clubs for good, sensible business reasons and you will often find that a model shop proprietor is the prime mover in a club. Membership of a model club should be one of your first objectives, for it is here that you'll find friendly assistance in learning to build and fly your models - which is the object of the exercise after all. No modeller will stand by and watch a novice make mistakes which will cost him dearly.

If there is no model shop locally, buy yourself a magazine and take a look through the advertisement columns to identify the nearest. Aeromodeller, Model Boats, Radio Control Models & Electronics and Radio Modeller all carry several pages of model shop directories in the back of each edition, and many of the more active or larger model shops also take display advertising space.

Having made contact with a modelling group, it's time to get started and wrestle with the big problem of choosing your modelling equipment - radio gear, model, engine etc. Choice will, of course, be limited by your budget. All other decisions are secondary to choice of radio gear and here is where the model club first comes in useful. Take a look round and discover what's most popular in the club. Whatever brand it might be, and there is a very wide choice these days, fall in with the pattern because this is the gear that most in the club have found reliable. Unsatisfactory radio equipment is never tolerated for long by any modeller and 'lemons' are soon off-loaded in favour of more reliable brands.

There is another reason for falling in with the club pattern though. Time was when the standard method of teaching a beginner how to control an R/C model was for an experienced club 'test pilot' to take the model to a safe altitude, trim the thing out for stable flight and then hand the transmitter to the neophyte owner who would then begin to feel out the characteristics of the model. This is common practice even today and the system works. But there is always the risk that the pupil pilot will uncomprehendingly manoeuvre the model into an impossible attitude, usually too near the ground for recovery, before looking round for the nearest person into whose hands he can shove the transmitter. At that late stage though, for all the use it is,you might just as well switch off because it doesn't even make a good paper weight. However, folks, thanks to the wonders of progress and model technology,. there's a better way. Most current R/C transmitters feature what is called a 'buddy box' facility or pupil/pilot training system. Without explaining exactly what goes on electronically, each transmitter is provided with a push button, usually in one of the top corners of the transmitter case, plus a socket for a wander lead which can be purchased as an optional extra. With a plug at each end, the wander lead is inserted into the sockets of both pupil and pilot transmitters in such a way that all control is at the teacher pilot end until the changeover button on the teacher's transmitter is depressed transferring command to the pupil's end. The pupil can then tool the model around until working himself into the inevitable situation, whereupon the teacher pilot instantly regains command before the situation becomes irretrievable.

The buddy box system, if fitted, only works for transmitters of identical brand and here is one of the reasons for taking a good look around what's being used in your newly found club, because by matching up, an experienced club flier will be able to teach you using the buddy box system.

Choice of equipment will inevitably hinge on your budget but one pre-requisite which should be followed is a preference for multi-channel proportional equipment as opposed to less expensive but far less effective single channel. Multi-proportional radio offers control in which the control surfaces move in direct proportion to the amount of control stick movement - just like the full size. Additionally, multi-propo sets (getting the hang of the stock abbreviations?) come completely wired up and ready for use - all you have to do is plug everything in, switch on, and its all working.

The initial cost of a multi-propo set is going to be a drain on your resources, but there are some options open to you. For instance, you can choose how many functions you require. Most modellers aspire ultimately to full aerobatic flying which demands a minimum of four independent control functions to operate the rudder, elevator, throttle and aileron controls. To a beginner, however, the last mentioned is the least important. Throttle command can also be dispensed with leaving a minimum control requirement of two independent command functions for rudder and elevator. Such will teach you all the basics of control and train you to complete competence before any additional functions are necessary. Once you've mastered the basics, however, and can operate your model from take-off to touch-down without assistance, and without the need for a more experienced modeller to stand at your elbow, you'll inevitably want to expand the control capability of your model and will ultimately start building models capable of more exciting things.

Two function proportional systems are the least expensive, naturally, but if after initial training you require more control functions, few of these two function systems can be expanded to offer more controls and will have to be traded in on a more expensive set. Inevitably, you lose - just like buying a new car. For this reason you should consider the extra expense of an R/C system which offers four, five, or even six control functions as an initial purchase because in the long term it's going to be the most economical buy. Even if you buy a four, five or six function system though ('full house' we call it), many can be bought with fewer than the full complement of servo mechanisms. The servo is the last link in the chain between your hand which operates the control column on the transmitter and the control surface of the model. The servo translates your command into control surface movement. Initially, since you require only elevator and rudder controls, throttle as well if you like, you can buy your 'full house' radio set with only two or three servos and minimise outlay.

Having bought your radio gear you'll have to look out for a satisfactory trainer model in which to fit it. But before doing so, this really is the stage at which it's really worthwhile sitting down with a good book on the subject and read it cover-to-cover until you understand it.

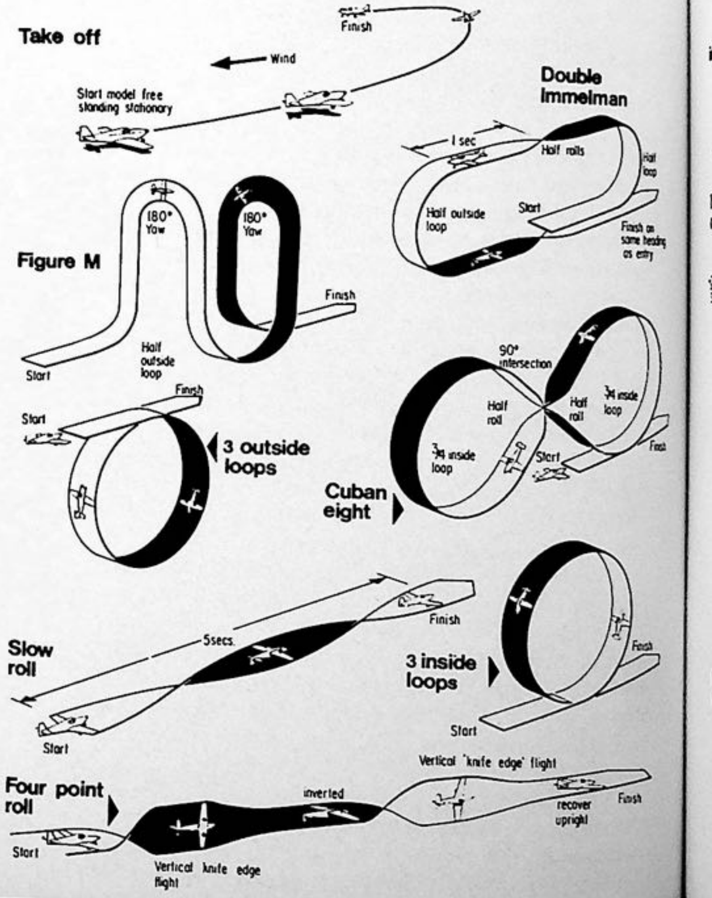
No short guide such as this piece you are reading can ever hope to do more than wet your enthusiasm. Two really first class instruction manuals written specifically for the beginner are David Boddington's Radio Control Primer (M.A.P. Ltd., PO Box 35, Bridge Street, Hemel Hempstead, - price £1.50) and the Radio Modeller Propo Book. Each of these deals with the practical how-to of R/C model aircraft operation in simple non-technical terms for the uninitiated, with special information on building the model, installing equipment, preparing for flight and flying. It's all there, an excellent 'square one' for the novice and it's well worth reading both books.

Choosing your first trainer model is another major headache. Here again your club can be a source of help. Even their most experienced man had to learn somewhere and you'll probably find that they've standardised on a type of design on which all club novices learn.

Generally, however, you'll be looking for a sturdy 48-54 in. span high wing model with a flat bottom wing section and designed for engines of about 3.5cc capacity. Examples of the type of machine you're looking for are the Graupner

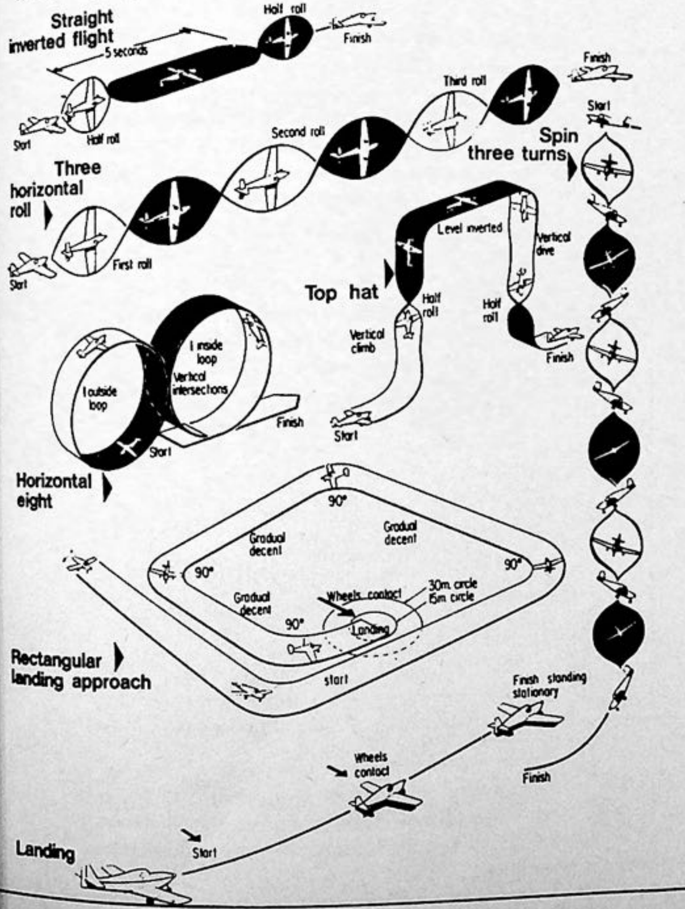
R/C

The fourteen manoeuvres illustrated (including take-off and landing) cover the aerobatic contest stunt schedule. Some are obviously more difficult than others and may be beyond the capabilities of certain R/C model designs - regardless of the skill of the pilot.



STUNT SCHEDULE

Even an R/C trainer, though, should be capable of loops, inverted flight and rolls - exciting enough manoeuvres in themselves for a start. And remember that good take-offs and good landings are the measure by which an R/C pilot is judged.



Taxi, Amateur and Terry, the Schuco Snoopy and Aviette Trainers (see following pics). Others exist obviously and here again, experienced modellers in your club will advise.

Care of your equipment is essential if it's going to last. Much on this subject can be found in those books we recommended earlier but there are one or two basics that should be mentioned. Never for instance, store radio gear away in the garden shed between flying sessions. It's damp and cold usually in such places and since you would never dream of doing such a thing with the telly, why do it to a piece of electronic equipment which is every bit as delicate and complex in it's own way. Always take time out to clean down a model completely after a flying session, checking that no exhaust residue has seeped into the model's internals.

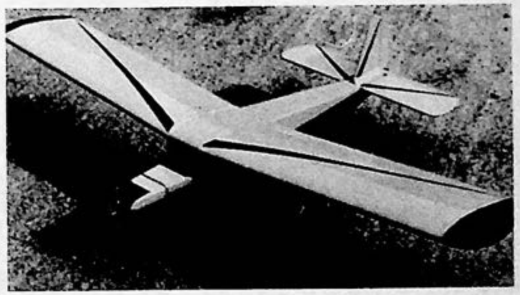
Take out third-party insurance and USE A REALLY EFFECTIVE SILENCER.

Finally, read the monthly R/C modelling magazines, they're a ready source of information on what's new in the R/C hobby, modelling techniques, news of new products and are good value.

Good luck with your new hobby. It's one of the most enjoyable and rewarding that man has yet devised.

CAMBRIA DRAGONFLY specifically developed as an R/C trainer and virtually crashproof with its tough 'Trithane' moulded fuselage. 57" span for engines up to .35 cu in.

SCHUCO'S 'SNOOPY' - easy-to-assemble model with pleasing, realistic lines. Conventional balsa fuselage construction. 58" span. SO EASY TO FLY.



AVIETTE TRAINERS - available in two sizes 48" or 60" span. BASIC or FULLHOUSE. Sheet balsa fuselage, foam wings. Tough, durable models with good flying performance.

GRAUPNER 'TAXI' - nicely styled 59" span R/C sports/trainer for .15 to .35 engines. The 'AMATEUR' is very similar in appearance but smaller (43" span for .09 engines).

RIPMAX-FUTABA

RIPMAX

'M' SERIES

'M' for 'MICRO'. Micro-precision engineered throughout (using integrated circuits in servos and receivers specially developed for Futaba), new Micro-Plugs (with gold plated contacts) on the wiring harness. Plus Tx-Rx-Servo performance standards BETTER THAN EVER BEFORE !

For years Ripmax-Futaba has been a top name in 'propo' for PERFORMANCE and RELIABILITY - a reputation endorsed by thousands of Futaba users all over the world. And Ripmax-Futaba is something special. We set our own specification requirements - tighter than rest-of-the-world standards - and Futaba meet them!

Series M is third generation equipment incorporating all the experience gained over the last decade in radio control electronic and mechanical design. A transmitter receiver combination that we believe is virtually unbeatable for performance, reliability...quality... and value for money. In 2-, 3-, 4- and 6-function combos. Plus new matching servos which set, almost unbelievable standards of performance. Centering to plus or minus ½ of 1 -er cent, for example - with ideal damping so that they stop dead centre. And with an overall system resolution of plus or minus 0.07 per cent.

You also get the fourth advantage of a new three wire hook-up providing normal operation even in the event of a single cell failure in the receiver ni-cad battery. An unlikely event, perhaps, but an example of the EXTRA reliability built into Series M Futaba.

TRANSMITTERS...

Ripmax-Futaba transmitters are styled right, look right - and feel right to hold and operate. That's because they are ergonomically engineered, perfectly balanced, easy to use. With POWERFUL rf output for positive control at even extreme range. Precision control sticks (with long and short ends - just fit the ones you prefer) for smooth and easy operation. Self-centring or with smooth micro-ratchet locking for throttle control. Separate trim controls (do not alter position of control sticks). Solid state circuitry throughout - temperature stable and voltage regulated. All transmitters also fitted with battery condition meter. Aerial angled for maximum radiation pattern.

RECEIVERS...

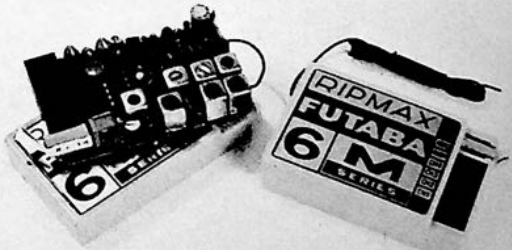
Solid state circuitry throughout (including IC's), with double-tuned front end and special RF and oscillation section shielding. Temperature- and voltage- stabilised circuitry. Plus noise lock-out circuitry to eliminate interference.

Each receiver is housed in a small, high-strength, lightweight high impact plastic case with circuit board locked in for maximum crash protection. Rx crystal can be changed without removing receiver case. (Six sets of crystals are supplied with each 'combo').

Pre-wired receiver harness incorporates on-off switch and gold plated plugs and socket connectors. Pre-wired servo plugs (also gold plated) connect directly to the receiver.

Receiver size:	2 5/8" x 1 9/16" x 3/4"	
Receiver weights:	2-function	1¾ ounces
	3-function	1¾ ounces
	6-function	2 ounces

Note: a 6-function receiver is supplied with a '4' combo.



EACH RIPMAX-FUTABA COMBO COMES COMPLETE WITH:-

6 pairs of crystals... long and short control stick knobs... external charger and charging lead... adjustable neckstrap (3, 4 and 6 only)... servo mounting trays plus single mounts for vertical or horizontal mounting of individual servos... extension servo lead to accommodate remotely-positioned servo... servo mounting kit... full set of frequency pennants.

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5/8" x 1 9/16" x 3/4"
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ith a '4' combo.

WITH:-

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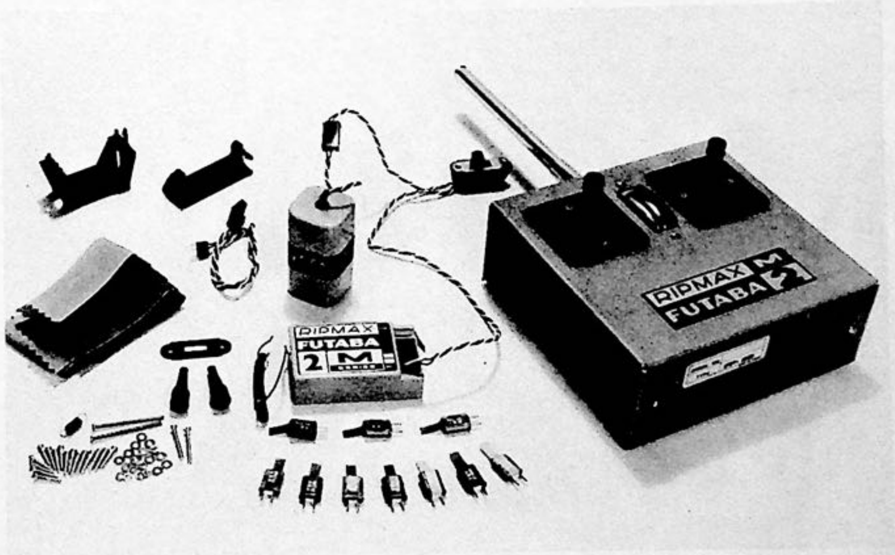
2 CHANNEL...

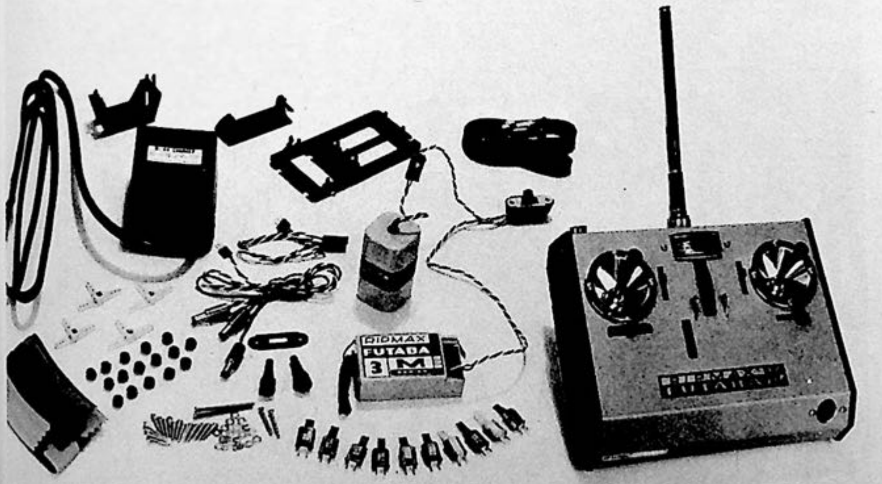
Compact 2-function proportional combo giving an all up installed weight (with 2 servos) of only $9\frac{1}{4}$ ounces. The transmitter has two separate control sticks (one for each control service), with the option of self-centering or ratchet movements, also stick movements (up-down or left-right). On-off switch on top of the case has simple 'off' lock.

The transmitter is handily sized - 5 7/8" x 5 5/8" x 2 1/8". Its light weight makes it non tiring to hold and the control sticks are positioned for easy manipulation. A battery condition meter located between the two control sticks gives a positive indication when the transmitter is on the air.

The combo includes a matching 2-function receiver - plus all the standard 'extras' listed on the previous page. Connection is simple. Simply plug the wiring harness into the receiver and to the RX battery outlet - and the servos of your choice into the receiver.

2-CHANNEL COMBO - cat no P-FD2M
SPARE RECEIVER - cat no P-FD52M





...3 CHANNEL

This 'combo' has the de-luxe version of the Futaba transmitters with one self-centering 'two-phase' control stick and one 'single-phase' control stick (which move either up-down or left-right) with ratchet braking. All three control services are fully proportional and simultaneous - i.e. all three control movements can be initiated at the same time, if required. Each of the three control services has a separate trim lever for fine adjustment of control function or trimming. The transmitter also has an attachment point for a neckstrap, socket connection for Tx battery charger (included with combo) and on-off switch with 'off' lock.

This transmitter also has 'buddy box' coupling facilities to another 3,4 or 6 transmitter for training instruction.

The matching 3-function receiver is supplied complete with wiring harness, etc. Installed weight (with 3 servos) is only $10\frac{1}{2}$ ounces. The outfit also includes alternative lever-type servo arms to replace rotary disc outputs on servos of your choice, if required.

3-CHANNEL COMBO - cat no P-FD3M
SPARE RECEIVER - cat no P-FD53M

RIPMAX-FUTABA

... 4 CHANNEL

The de-luxe transmitter has two 'two-phase' precision control sticks. Either the right- or left-hand stick can be self-centering, with ratchet braking on the 'up-down' movement on the other stick. All four controls can be operated simultaneously and each has its own separate trim control.

In addition to a battery condition meter, neck strap fitting, charger connection point and locking on-off switch, the '4' transmitter has an additional 'buddy-box' connection for coupling to a second ('3', '4' or '6') transmitter for training purposes.

The matching receiver is a 6-function model (although only 4 controls are operable from a '4' transmitter). All up weight with 4 servos is only 12 ounces. This combo provides full functional control coverage for aircraft with 'trim' on all four services. Throttle control and throttle trim can be coupled via a suitable actuator to provide an additional service (e.g. retractable undercarriage).

4-CHANNEL COMBO - cat no P-FD4M.

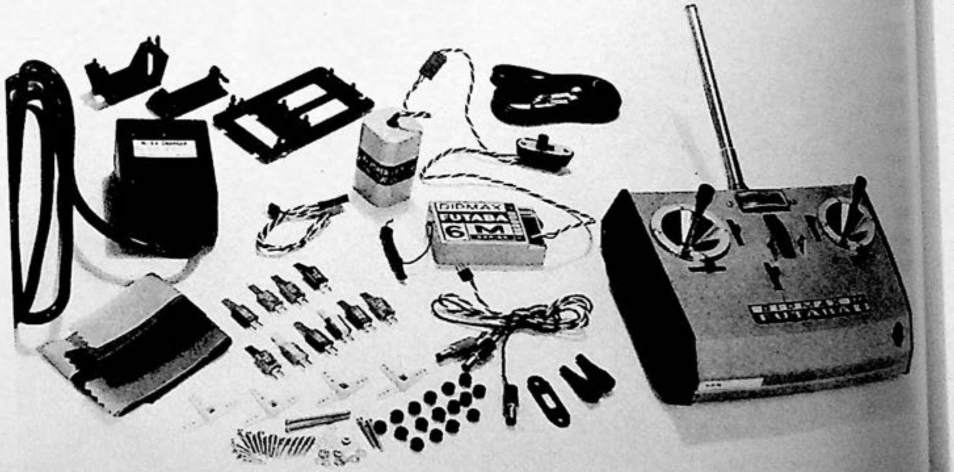
6 CHANNEL ...

The two 'two-phase' control sticks can be adapted to 'throttle left' or 'throttle right' if required; or both can be self centering on all four movements. Each movement has its own separate trim control. The other two functions are controlled by a trim-type lever, located just left of centre. All six control functions are available simultaneously.

The '6' transmitter has 'buddy-box' plug-in facilities to use with another '6' transmitter (or a '4') for training - plus battery condition meter, neckstrap fitting, charger connection point and locking on-off switch.

Installed weight with '6' receiver and 4 servos is only 12 ounces. Additional servos can be added for independent operation of other flying controls such as flaps and undercarriage, or other special services as required. This 6-function outfit, in fact, covers virtually all possible model control requirements. Each additional servo adds approximately 1¼ ounces to the installed weight.

6-CHANNEL COMBO - cat no P-FD6M
BUDDY BOX connecting lead P-FD48M
SPARE RECEIVER - cat no P-FD56M



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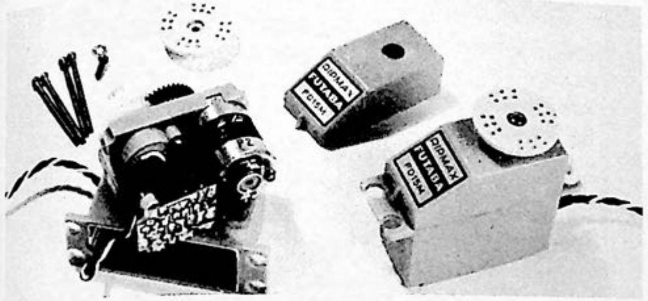
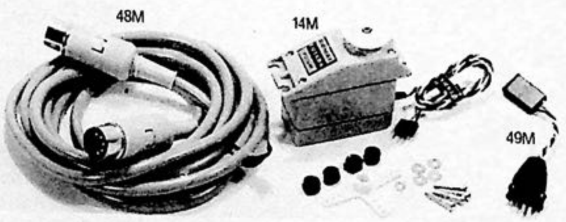


SERIES "M" MICRO SERVOS

These extremely compact MICRO SERVOS are based around an all-new 16mm electric motor specially developed for use with radio controlled equipment. The new MICRO SERVO ELECTRONICS are based on two integrated circuits specially developed for (and exclusive to) Futaba. Not just standard production IC's. IC(1) is equivalent to 73 transistors, 13 diodes and 79 resistors! IC(2) is equivalent to 4 hi-power transistors, 4 diodes and 4 resistors. SERVOS CENTRE to plus or minus $\frac{1}{2}$ of 1 per cent*! Plus ideal damping. That means servos stop - dead centre! SYSTEM RESOLUTION within plus or minus 0.07 per cent*. That means, it's just about perfect! HIGH TORQUE OUTPUT - giving 4lb thrust* in outer hole. TRANSIT TIME only 0.35 seconds*. That's incredibly fast. CURRENT DRAIN IDLING ONLY 7 milliamps* (Low, low current drain for maximum battery reliability). Servo size 1.15" x 1.45" x 0.7". Weight $1\frac{1}{4}$ ounces. All told, in fact, the new SERIES M MICRO SERVO is a masterpiece of miniaturised electronic/mechanical design, with the highest accuracy and reliability found anywhere.

*Measured on a typical production sample.



The 14M MINI SERVO is another rotary output servo, slightly larger in size with a more powerful motor and slightly different gear ratio. Torque output has been increased to give over 7lb thrust - centering, resolution and transit time being similar to the MICRO SERVO.

A very special feature of the MINI SERVO is that the case joint, lead entry point and spindle are fitted with seals, making the complete servo FULLY WATERPROOF and so ideal for MODEL BOATS (or seaplanes, etc.,). Servo size: $1\frac{1}{2}$" x 1 9/16" x 7/8". Weight $1\frac{3}{4}$ ozs. The BUDDY BOX TRAINER LEAD permits connecting any two transmitters (not a '2') for instructor/pupil training. The PLUG ADAPTOR permits the older FUTABA SERVO to be plugged in to the new RECEIVER.

SPARE ACCESSORIES

P-FD124M	Receiver Nicad Pack (all Receivers)
P-FD128M	Transmitter Nicad Pack (all Transmitters)
P-FD130M	Ripmax-Futaba Nicad Charger
P-FD131M	Transmitter Charging Lead (2-channel only)
P-FD132M	" " " (3,4 & 6-channel)
P-FD135M	Receiver Charging Lead (all Receivers)
P-FD165M	Receiver Harness with Switch
P-FD167M	Micro Servo Side Mount
P-FD168M	" " Base Mount
P-FD169M	" " Triple Mount
P-FD175M	Servo Extension Lead
P-FD190M	Transmitter Neckstrap (3,4 & 6-channel)

SERVOS, CONTROLLERS & ACCESSORIES

P-FD14M	Mini Servo (rotary)
P-FD15M	Micro Servo (rotary)
P-FD19M	Electric Motor Speed Controller
P-FD48M	Buddy Box Trainer Lead
P-FD49M	3-Pin to 5-Pin Plug Adaptor

SPARE CRYSTALS

	TX CRYSTALS	
P-FD201	Grey/Brown	(26.975)
P-FD202	Brown	(26.995)
P-FD203	Brown/Red	(27.025)
P-FD204	Red	(27.045)
P-FD205	Red/Orange	(27.075)
P-FD206	Orange	(27.095)
P-FD207	Orange/Yellow	(27.125)
P-FD208	Yellow	(27.145)
P-FD209	Yellow/Green	(27.175)
P-FD210	Green	(27.195)
P-FD211	Green/Blue	(27.225)
P-FD212	Blue	(27.255)
	RX CRYSTALS	
P-FD301	Grey/Brown	(26.520)
P-FD302	Brown	(26.540)
P-FD303	Brown/Red	(26.570)
P-FD304	Red	(26.590)
P-FD305	Red/Orange	(26.620)
P-FD306	Orange	(26.640)
P-FD307	Orange/Yellow	(26.670)
P-FD308	Yellow	(26.690)
P-FD309	Yellow/Green	(26.720)
P-FD310	Green	(26.740)
P-FD311	Green/Blue	(26.770)
P-FD312	Blue	(26.800)

GRUNDIG PROPORTIONAL

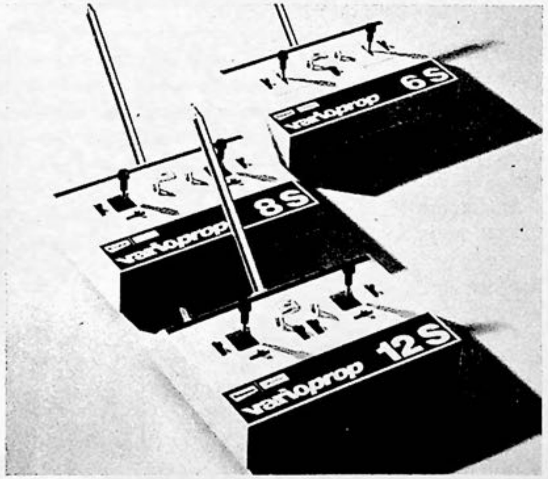
RIPMAX

GRUNDIG varioprop

Grundig VARIOPROP is a sophisticated and very highly developed Radio Control system. Fully digital, fully proportional and fully simultaneous, operatable on any of the 12 'spot' frequencies in the 27 MHz band.

This is the system chosen by leading Continental European R/C modellers for sport and contest flying - and it has achieved an outstanding reputation for reliability in both these fields. At the same time the receiver system is extremely flexible, utilising plug-together modules to build up to the number of functions required. To complete the system, a wide range of plug-on servos are available, selected according to the function required.

Needless to say, with names like Graupner and Grundig behind it, VARIOPROP is impeccable for the quality of both its mechanics and electronics.



varioprop 6

This TRANSMITTER provides three proportional functions via two precision neutralising control sticks with separate trim controls, and a lever controlling the third function. The control stick assemblies can be rotated 90 degrees, if required, and converted to non-neutralising mode.

An integral meter indicates RF output as a constant monitor. Charging socket for the Tx battery and plug-in crystal socket are accessible from the exterior.
VARIOPROP 6S TRANSMITTER (less DEAC)
cat no P-G3810.

varioprop 8

This 4-function transmitter provides four proportional functions operated by two self-neutralising sticks. A separate trim control is available for each function. Stick movement(s) can be converted to non-neutralising if required. Complete with integral meter, plug-in crystal mount and external battery charging socket.

VARIOPROP 8S TRANSMITTER (less DEAC)
cat no P-G3811.

varioprop 12

This transmitter is equipped with two precision 2-way sticks with separate trim controls. The neutralising control sticks can be converted to non-neutralising by switching a ratchet spring. The two other proportional functions are controlled by rotating lever type switches - giving a total of 6 PROPORTIONAL functions in all.

The sequential order of the various channels may be individually selected by appropriate plug-in connections in the transmitter. The sophisticated design of the pulse-generator ensures reliable control operation even under voltage fluctuations or extremes of temperature.

Other features are the same as those of the VARIOPROP 6 and VARIOPROP 8 - i.e. integral meter, charging socket and plug-in crystal socket accessible externally, on-off switch with lock.

The size of all three transmitters is also the same i.e. 200 x 158 x 47mm (8 x 6 x $1\frac{3}{4}$ inches approx.)
VARIOPROP 12S TRANSMITTER (less DEACS)
cat no P-G3812.

TRANSMITTER ACCESSORIES

P-G3616	D10/500P Transmitter DEAC (fitted)
P-G3538	Charging Lead for Tx DEAC
P-G3637	Suspension Mounts for Transmitter
P-G3638	Neck Strap for Transmitter
P-G3662	Long Stick Extensions (pr)

RIPMAX

rioprop 12

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with separate trim controls. The neutrali
sticks can be converted to non-neutrali
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IOPROP 12S TRANSMITTER (less DEACS
o P-G3812.

NSMITTER ACCESSORIES
3616 D10/500P Transmitter DEAC (fitte
3538 Charging Lead for Tx DEAC
3637 Suspension Mounts for Transmitter
3638 Neck Strap for Transmitter
3662 Long Stick Extensions (pr)

THE RECEIVER SYSTEM

The RECEIVER SYSTEM is based on a MINI-SUPERHET RECEIVER MODULE and a variety of SERVO MODULES which plug into it.

The MINI SUPERHET RECEIVER MODULE measures 58 x 42 x 21 mm and weight 48 grams (1.7 ounces). This receiver can be operated off any VARIOPROP transmitter, with the appropriate crystal plugged in.

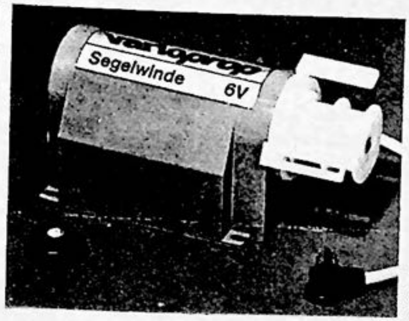
The 2-CHANNEL SERVO MODULE plugged into the receiver permits operation of one VARIOPROP or MICRO 05 SERVO. Module size is 58 x 42 x 18 mm. Weight 33 grams. The 4-CHANNEL SERVO MODULE permits operation of two VARIOPROP or MICRO 05 SERVOS. Weight of this module is 44 grams. Combination of 2 and/or 4-channel modules can be added together for covering up to 12 channels (operating six servos).

The 8-CHANNEL SERVO MODULE does not have built-in amplifier circuitry and can only be used with the MICRO C05 SERVO. Four of these servos can be operated from this module.

There is also a SLIDING REGISTER MODULE which can be plugged in to permit temporary bridging of 4 channels on the VARIOPROP receiver when they are not required for any reason. Also special modules for RETRACT FUNCTION and SPEED CONTROL.

RECEIVER MODULES AND ACCESSORIES

P-G3739	Varioprop	Mini Superhet Receiver
P-G3742	"	2-channel Servo Module
P-G3743	"	4-channel Servo Module
P-G3825	"	8-channel " "(C05)
P-G3746	"	Retract Servo Module
P-G3748	"	Sliding Register Module
P-G3624/0	"	Speed Control Module
P-G3607	Oblong Rx DEAC Pack	
P-G3608	Cylindrical Rx DEAC Pack	
P-G3536	Charging Lead for Receiver DEAC	
P-G3606	Wiring Harness for Receiver	



SERVOS

The VARIOPROP push-pull servo is based on a Mitsumi motor and is connected by plugging into a 2- or 4-channel MODULE. It is equally suited for control surface or throttle control operation. Size 60 x 23 x 27mm. Weight 50 grams. Output force 1500 grams. The alternative MICRO SERVO is smaller and again with linear output. Size 45 x 29 x 19 mm. Weight 33 grams. Output force 1300 grams. It comes in two versions, the 05 and C05, the latter having a built in amplifier. The SAIL WINCH plugs into a 2- or 4-channel module only and requires its own separate battery. Size 80 x 34 x 48mm. The VARIOPROP SPEED CONTROL UNIT also requires its own special module and battery.

SERVOS, SWITCHES & ACCESSORIES

P-G3762	Varioprop	Sail Winch Servo
P-G3764	"	Retract "
P-G3765	"	Std. Push-Pull "
P-G3830	"	Micro Push-Pull 05
P-G3833	"	" " " C05
P-G3623	"	Polarity Switcher complete
P-G3623/1	"	Polarity Switcher Plate only
P-G3624/8	"	Speed Control Unit
P-G3610	D2/225P	Retract Servo DEAC
P-G3612	D5/500P	Sail Winch DEAC
P-G3660	Servo Reverse Direction Lead	
P-G3682	Servo Extension Lead	

GRUNDIG VARIOPROP COMBO - cat no P-G3800

This contains an 8S TRANSMITTER, plus MINI SUPERHET RECEIVER, an 8-CHANNEL SERVO MODULE and four VARIOPROP C05 MICRO SERVOS - plus Tx and Rx DEAC's and one pair of crystals.

GRAUPNER
MINIPROP

RIPMAX

Graupner

MINIPROP

'MINIPROP' is a small, lightweight 4-function PROPORTIONAL system. The COMPLETE OUTFIT consists of a 4-channel MINIPROP transmitter, MINIPROP superhet receiver and two MINIPROP servos. Transmitter, receiver and servos are also available separately. Other matching accessories include a Battery Box (taking four 1.5 volt dry batteries of pencell size), servo bracket clips and an electric motor switcher to fit the MINIPROP servo as an attachment.

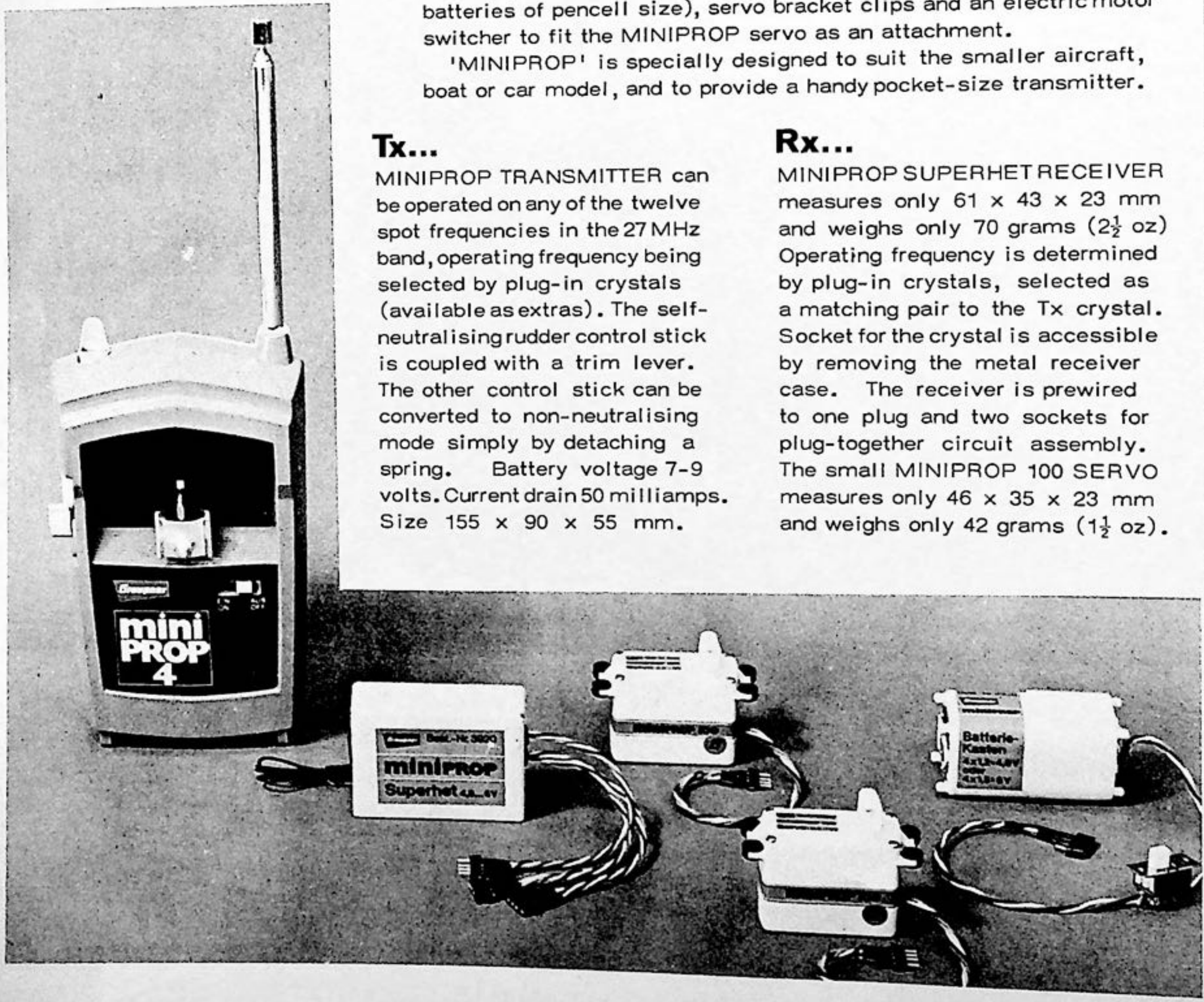
'MINIPROP' is specially designed to suit the smaller aircraft, boat or car model, and to provide a handy pocket-size transmitter.

Tx...

MINIPROP TRANSMITTER can be operated on any of the twelve spot frequencies in the 27 MHz band, operating frequency being selected by plug-in crystals (available as extras). The self-neutralising rudder control stick is coupled with a trim lever. The other control stick can be converted to non-neutralising mode simply by detaching a spring. Battery voltage 7-9 volts. Current drain 50 milliamps. Size 155 x 90 x 55 mm.

Rx...

MINIPROP SUPERHET RECEIVER measures only 61 x 43 x 23 mm and weighs only 70 grams (2½ oz) Operating frequency is determined by plug-in crystals, selected as a matching pair to the Tx crystal. Socket for the crystal is accessible by removing the metal receiver case. The receiver is prewired to one plug and two sockets for plug-together circuit assembly. The small MINIPROP 100 SERVO measures only 46 x 35 x 23 mm and weighs only 42 grams (1½ oz).



GRAUPNER PROPORTIONAL R/C EQUIPMENT

P-G3900	Miniprop complete with 2 servos
P-G3910	Miniprop 4-channel Transmitter
P-G3920	" 4-channel Receiver
P-G3930	" Receiver Battery Box
P-G3940	" 100 Servo
P-G3970	" Servo Bracket Clips (set)
P-G3768	" Electric Motor Switcher

GRUNDIG CRYSTALS

Matching both the GRUNDIG VARIOPROP and GRUNDIG MINIPROP Transmitter-Receiver combos with 460 KHz intermediate frequency for superhet receiver operation.

	TX CRYSTAL	
P-G3550	Grey/Brown	(26.975)
P-G3551	Brown	(26.995)
P-G3552	Brown/Red	(27.025)
P-G3553	Red	(27.045)
P-G3554	Red/Orange	(27.075)
P-G3555	Orange	(27.095)
P-G3556	Orange/Yellow	(27.125)
P-G3557	Yellow	(27.145)
P-G3558	Yellow/Green	(27.175)
P-G3559	Green	(27.195)
P-G3560	Green/Blue	(27.225)
P-G3561	Blue	(27.255)
	RX CRYSTAL	
P-G3570	Grey/Brown	(26.515)
P-G3571	Brown	(26.535)
P-G3572	Brown/Red	(26.565)
P-G3573	Red	(26.585)
P-G3574	Red/Orange	(26.615)
P-G3575	Orange	(26.635)
P-G3576	Orange/Yellow	(26.665)
P-G3577	Yellow	(26.685)
P-G3578	Yellow/Green	(26.715)
P-G3579	Green	(26.735)
P-G3580	Green/Blue	(26.765)
P-G3581	Blue	(26.795)

PMAX

RTIONAL R/C EQUIPMENT

omplete with 2 servos
-channel Transmitter
-channel Receiver
eceiver Battery Box
00 Servo
ervo Bracket Clips (set)
lectric Motor Switcher

RYSTALS

GRUNDIG VARIOPROP and
ansmitter-Receiver combos
ate frequency for superhet

STAL

rown	(26.975)
	(26.995)
Red	(27.025)
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ange	(27.075)
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/Green	(27.175)
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YSTAL

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	(26.635)
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	(26.685)
/Green	(26.715)
	(26.735)
Blue	(26.765)
	(26.795)

RIPMAX

CHOOSING A PROPORTIONAL OUTFIT

HOW MANY CHANNELS

A single 'proportional' channel is the equivalent of TWO non-proportional radio channels. Continental European radio manufacturers, in fact, still speak of 2-channels as covering ONE proportional function - e.g. the GRUNDIG '12-channel' proportional equipment is actually 6-FUNCTION proportional. In Britain, America and Japan, proportional is now generally described as '1' (one proportional function), '2' (two proportional functions), etc...

Some outfits offer an additional non-proportional channel, e.g. 2 + 1. This means two separate proportional controls, plus an additional non-proportional control.

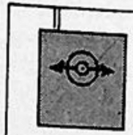
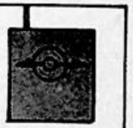
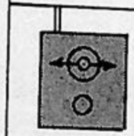
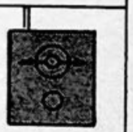
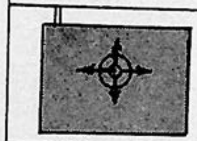
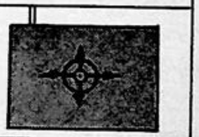
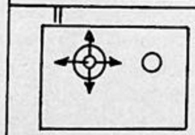
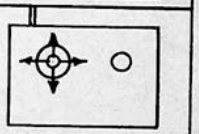
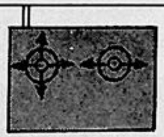
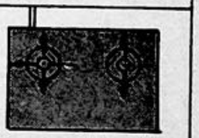
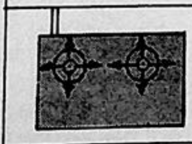
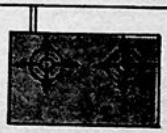
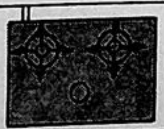
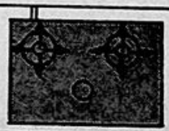
The chart opposite shows the preferred allocation of available controls. With a '1' outfit, for example, the choice is rudder control, for both gliders and power models. A '1 + 1' outfit would be best using the extra (single) channel for elevator on a glider, and engine throttle on a power model.

The more control services available, the better, of course. But you only need to go to a '3' outfit for complete functional control of a glider. With a power model you need a '4' outfit for complete control. Additional channels are for secondary services, like flaps or undercarriage retraction.

Your minimum target is, therefore, a '3' for a glider and a '4' for a power model. But you can get by with less coverage; although it will not give you complete control of all the vital services.

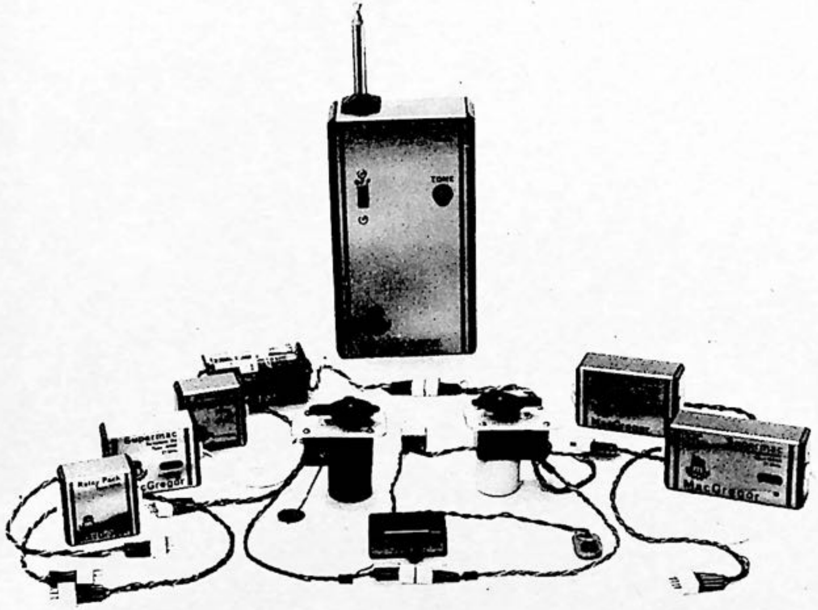
There are other alternative combinations you can try with reduced control coverage available, but the recommendations in the table will normally give best results.

Remember that with PROPORTIONAL channels you also get a separate TRIM control. This can be used either for adjusting a neutral position, or fine trimming control.

GLIDERS ○		RUDDER	ELEVATORS	AILERONS	SPOILERS OR U/C RETRACT	FLAPS	THROTTLE		POWER ●
	1	○ ●						1	
	1+1	○ ●	○				●	1+1	
	2	○ ●	○				●	2	
	2+1	○ ●	○ ●	○			●	2+1	
	3	○ ●	○ ●	○			●	3	
	4	○ ●	○ ●	○ ●	○		●	4	
	6	○ ●	○ ●	○ ●	○ ●	○ ●	●	6	

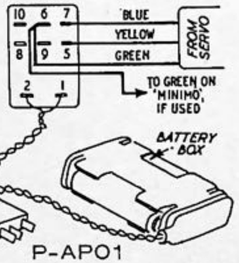
RIPMAX

MACGREGOR RADIO



MACGREGOR SINGLE CHANNEL R/C EQUIPMENT

	Separate Transmitters and Receivers
P-MR200	Powermac Transmitter with S/R Xtal
P-MR30	Minimac R/Less Receiver (Superegen)
P-MR40	" Relay " (")
P-MR50	Supermac R/Less Receiver (Superhet)
P-MR60	" Relay " (")
	Transmitter-Receiver Combos
P-MR230	Powermac Superegen R/Less Combo
P-MR240	" " Relay Combo
P-MR250	" S/H R/Less Combo with Xtals
P-MR260	" " Relay Combo with Xtals
	Pre-Wired Packs
P-AP01	MacGregor Relay Pack
P-AP21	" Minimite Servo Pack
P-AP22	" Minimo
P-OR1	Minimite Rudder Servo
P-OR2	Minimo Motor Servo



P-AP01

P-OR2

P-OR1

Whether you're a newcomer to R/C, a 'just for fun modeller', or a serious competitor, MacGregor have an outfit just for you.

From simple, minimum cost, single channel equipment (push button and proportional) right up to sophisticated full house 4 and 6 channel proportional equipment, whatever the application, MacGregor outfits give the same high quality and reliability for hour upon hour of smooth precision control !

The price is right too ! How, you may ask - MacGregor do not cut corners just to compete in a price war. Thousands of modellers all over the world have come to the conclusion that MacGregor equipment is equal to anything available, whatever the cost. Hence, by virtue of the resulting volume of sales (unequalled this side of the Atlantic) and production enterprise, MacGregor offer you a unique facility - the quality you expect at a price you can afford.

MACGREGOR SINGLE CHANNEL

The simplest and least expensive control available. This equipment provides the basic requirements for effective control of a model, i.e. direction and speed. The functions are selected by a simple sequence of operations of a push button on the transmitter. The resultant operation is simply position selective and must not be confused with the sophisticated proportional control available from all other outfits shown.

The attractively styled MR200 transmitter forms the basis of each outfit. Coupled with one of the four miniature receivers it provides incredibly stable 'out of sight' range and affords easy and rapid signalling. Power requirement is 6 pen cells.

The Supermacs are superhet receivers capable of extremely high interference rejection. They are operable on 12 interchangeable frequencies each with complete immunity from the other. A must for clubs and social modelling. For the loner, the simpler Minimac is available. This operates on a solitary fixed frequency and does not have the capability to reject other signals as the Supermac. It is therefore only recommended for use in locations well away from other modellers.

Minimac and Supermac are available in relay and relayless versions. The former can be used with any commercially available actuator, motorized or otherwise, whilst the latter is only suitable for rubber driven escapements to provide an ultra light weight system. Relayless receivers convert to relay operation by the addition of the AP10 Relay Pack. All receivers operate from a 9 volt PP3 type battery.

Outfits include Tx, battery box, Rx battery connector, plus full instructions and six months Guarantee. A single Tx crystal is provided in the outfits with Minimac receivers or a matched pair of plug-in crystals in the Supermac outfits.

DIGIMAC 1+1

There is no doubt that proportional control is the dream of every potential R/C modeller, but in years gone by high cost has usually been the biggest hindrance when considering the venture.

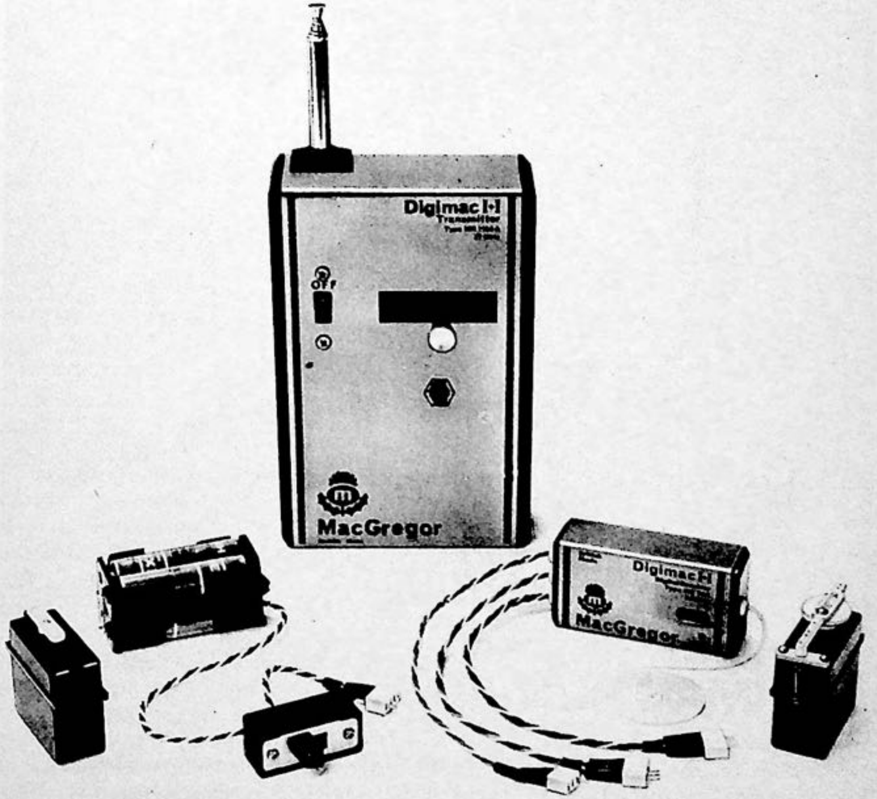
Today however things have changed. With the introduction of the MacGregor Series II Digimac range starting with this, the Digimac 1 + 1, proportional control is now within the grasp of any would-be enthusiast, with the highest reliability and performance factor consistent throughout.

The Digimac 1 + 1 provides a single fully proportional function via its joy stick control with an MR 10P Proportional Micro Servo for precise directional control of boats, cars and even simple rudder only aircraft. In addition, in order that some degree of engine speed variation can be obtained, a special MR9 or MR 11 three position sequential servo is added, this being operated by a simple push button on the transmitter. For electric motors an extra AP14 E.M. switcher can be added to control speed or direction.

The outfit is ruggedly constructed and presented in the familiar eye-catching MacGregor style and precision engineered controls and mechanics are employed throughout.

To minimise the cost the entire combinations of slimstyle transmitter, miniature receiver and tiny precision servos operates from easily replaceable pen cell batteries (10 in all) yet provides all the qualities of long range, stability, interference rejection, etc., normally only expected with more expensive rechargeable batteries. As a service facility, should rechargeable batteries be desired, these can be fitted at nominal cost.

Last but not least, the equipment is supplied complete with fully comprehensive manual and one pair of matched interchangeable crystals.



MATCHED PAIRS OF CRYSTALS

P-MR0/1	Grey/Brown	(26.970)	P-MR3/4	Orange/Yellow	(27.120)
P-MR1	Brown	(26.995)	P-MR4	Yellow	(27.145)
P-MR1/2	Brown/Red	(27.020)	P-MR4/5	Yellow/Green	(27.170)
P-MR2	Red	(27.045)	P-MR5	Green	(27.195)
P-MR2/3	Red/Orange	(27.070)	P-MR5/6	Green/Blue	(27.220)
P-MR3	Orange	(27.095)	P-MR6	Blue	(27.225)

P-MR1100A	DIGIMAC 1 + 1 Transmitter only (without crystals)
P-MR21A	DIGIMAC 1 + 1 Receiver only (without crystals)
P-MR1121A	DIGIMAC 1 + 1 (dry cells) Transmitter - Receiver Combo complete with one pair of crystals and dry cell battery boxes

Note: Servos shown in the above photo are extra items (see page 127)

DIGIMAC II & III

The most popular radio control sets in production in the UK!

For the boat, car or glider enthusiast the Digimac II coupled with two MR 12 servos or one MR 12, and an MR 15 Speed Controller for electric powered models, provides an inexpensive, dry battery operated system for precise proportional control of direction and speed.

The Digimac III on the other hand is fully proportional three channel system fitted with rechargeable nickel/cadmium batteries and is designed for the more adventurous, glider or powered plane modeller who does not wish the expense or complication of full house control.

Both outfits are superbly manufactured and presented in true MacGregor style. The transmitters are fitted with two main, precision single axis joy sticks both fitted with integral independent trim adjustment. The left hand moves vertically with a ratchet action (for throttle) on the Digimac II, whilst for the Digimac III it is self centring. The right hand direction control moves horizontally and is supplied self centring in both cases. Ratchet and self centring models are interchangeable.

In addition, the Digimac III sports a third non-trimmable, ratchet action joy stick situated below the right hand main function for throttle control.

Each system employs a similar miniature Digimac receiver giving outstanding performance in range, interference rejection and stability, and each is operable on 12 independent frequencies with interchangeable crystals.

The Digimac II operates from standard, high power pen cell batteries (10 in all) these giving an operating time of about three hours.

The Digimac III as stated, has rechargeable batteries and gives a flying time of approximately four hours per charge. An output meter is provided on the transmitter to register the state of charge and output and the outfit is supplied complete with special charger.

Both outfits are supplied complete with one pair of matched crystals and comprehensive manuals.

P-MR 1200	DIGIMAC 2 Transmitter only (without crystals)
P-MR 1300	DIGIMAC 3 Transmitter only (without crystals)
P-MR 22	DIGIMAC 2 Receiver only (without crystals)
P-MR 23	DIGIMAC 3 Receiver only (without crystals)
P-MR 1222	DIGIMAC 2 (dry cells) Transmitter - Receiver Combo complete with one pair of crystals & dry cell battery boxes.
P-MR 1323	DIGIMAC 3 (Nicads) Transmitter - Receiver Combo complete with one pair of crystals & Nicads with charger.

Note: servos shown in the photo opposite are not included in combo (see page 127)

DIGIMAC IV & VI

The pride of the MacGregor range. Two de-luxe outfits, the Digimac IV and Digimac VI, providing full house, high precision control for sport, competition or professional aeromodelling.

Transmitters are constructed in a heavy duty, clear vinyl clad anodized aluminium, which together with the superbly engineered and moulded end cheeks, controls and trimmings, provides a strong, comfortable design with an extremely attractive appearance which will last long after the newness is gone. MacGregor smooth action, dual-axis joy sticks control the four main functions and an individual, independent trim is provided for each. Self centring action is employed on these main functions with the exception of the left hand vertical movement. This is used for throttle control and operates with ratchet action. This standard arrangement can be altered if desired.

For the more complicated aircraft, the Digimac VI has two extra controls ergonomically situated on either side for easy fingertip control. These comprise a simple two position switch on the left for up and down control of retractable undercarriage and on the right hand side, a fully variable trim type control for flaps, brakes, etc.

non-trimmable, ratchet action
function for throttle control.
Digimac receiver giving
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not included in combo (see page 12

de-luxe outfits, the Digimac IV
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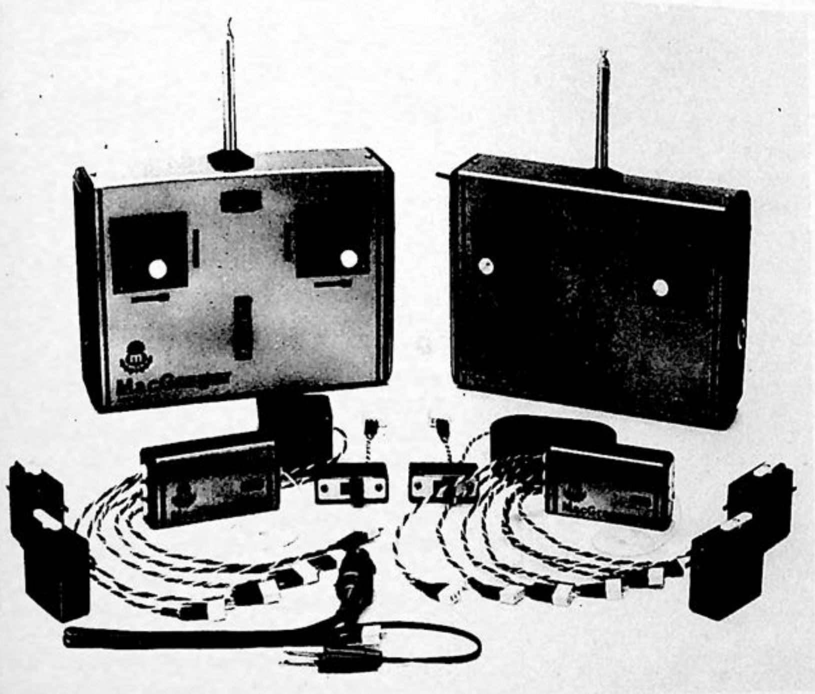
This standard arrangement can be

Digimac VI has two extra controls
easy fingertip control. These
n the left for up and down control
ht hand side, a fully variable trim

MACGREGOR SERVOS etc



Both Digimac IV and VI are provided with a neat neck strap attachment conveniently incorporated with the on/off switch escutcheon. An integral meter is provided in the transmitter to indicate state of charge and output. Rechargeable nickel-cadmium batteries give approximately four hours flying time per charge.

P-MR1400	DIGIMAC 4 Transmitter only (without crystals)
P-MR1600	DIGIMAC 6 Transmitter only (without crystals)
P-MR24	DIGIMAC 4 Receiver only (without crystals)
P-MR26	DIGIMAC 6 Receiver only (without crystals)
P-MR1424	DIGIMAC 4 Transmitter - Receiver Combo complete with one pair of crystals, Nicads with charger & charging harness (servos not included)
P-MR1626	DIGIMAC 6 Transmitter - Receiver Combo complete with one pair of crystals, Nicads with charger & charging harness (servos not included)

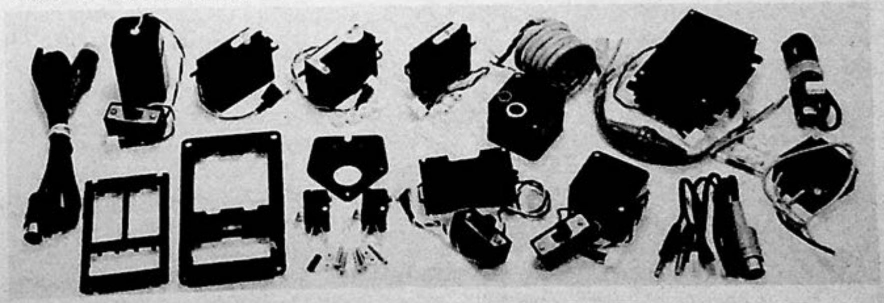
The 1 + 1 outfit accommodates one proportional servo (MR10) and one 3-position non-proportional servo (MR9 or MR11).

The 'II', 'III', 'IV' and 'VI' all accommodate proportional servos based on the MR12. The basic servo combines micro-miniature size with smooth, high resolution output. The new three wire amplifier employs a monolithic integrated circuit, stable timing capacitor, and long life cermet feedback potentiometer to provide the ultimate in centring accuracy, resolution and temperature stability. Gearboxes are quiet in operation with negligible backlash.

DIGIMAC PLUS-ONE MINI SERVO - cat no P-MR9.
DIGIMAC PLUS-ONE PROPORTIONAL SERVO cat no P-MR10.
DIGIMAC PLUS-ONE MICRO SERVO - cat no P-MR11.
DIGIMAC FAST-ACTION PROPORTIONAL MICRO SERVO - rotary output, 2lb pull, transit time 0.35 seconds. Cat no P-MR12F.
DIGIMAC HIGH-TORQUE PROPORTIONAL SERVO - rotary output, 5lb pull, transit time 0.8 seconds. Cat no P-MR12M.
DIGIMAC RETRACT SERVO - cat no P-MR13.
DIGIMAC SAIL WINCH SERVO - cat no P-MR14.
DIGIMAC ELECTRIC MOTOR CONTROLLER - cat no P-MR15.
(This servo takes the place of a proportional servo to provide fully proportional control of electric motors up to 30 volts 10 amps rating in both forward and reverse directions. Fully adjustable for use with any positive output digital system).

ANCILLARIES AND SPARE PACKS

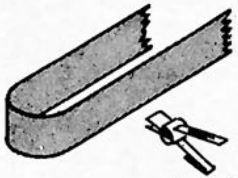
P-AP04	280 Rx Nicad Pack	P-AP15	550 Rx Nicad Pack
P-AP05	280 Charger	P-AP16	550 Charger
P-AP06	Buddy Box Harness	P-AP17	Mini Servo Mounting Brackets
P-AP07	Mini Servo Tray	P-AP18	Micro Servo Tray
P-AP08	Charging Harness	P-AP23	2.5 amp Suppression Pack
P-AP09	Rx Dry Cell Pack	P-AP24	10 amp Suppressor
P-AP14	Electric Motor Switcher	P-AP26	MR12 Gearing Conversion Pack



ELECTRICAL ACCESSORIES

FREQUENCY RIBBONS WITH CLIP

Q-CFR0	Grey
Q-CFR1	Brown
Q-CFR2	Red
Q-CFR3	Orange
Q-CFR4	Yellow
Q-CFR5	Green
Q-CFR6	Blue
Q-CFR10	Ribbon Set (1 ea x 7 colours)

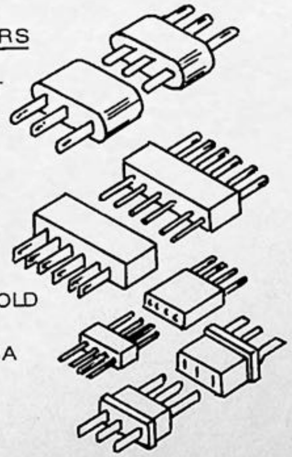


CHECK YOUR FREQUENCY !

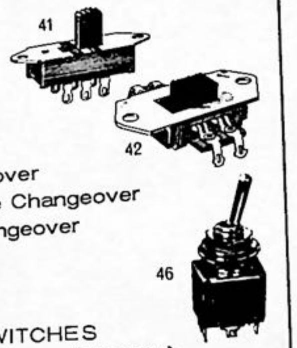
Even if your receiver is a superhet, another transmitter operating on the same frequency will interfere with it. So - before you start flying when there are other R/C modellers on the field - check that you are all operating on DIFFERENT FREQUENCIES. That's what frequency pennants are for. You can see at a glance what spot frequency another modeller is operating on. Choose a frequency not already in use - and clip the appropriate pennant on your own transmitter aerial.

MINIATURE CONNECTORS

	ORIENT
Q-OA3	3-Pin
Q-OA4	4-Pin
Q-OA6	6-Pin
Q-OA8	8-Pin
	MK
Q-MK96	6-Pin
Q-MK98	8-Pin
	MINIGOLD
Q-MC4	4-Pin
	FUTABA
Q-FR13	3-Pin
Q-FR15	5-Pin
Q-FR17	7-Pin
Q-FR20	4 x 5-Pin Futaba Socket only
Q-FR15P	5-Pin Futaba plug only



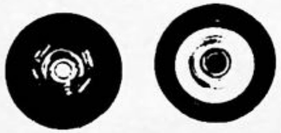
SWITCHES



	SLIDE SWITCHES
Q-RC41	Single Pole (NSF)
Q-RC42	Double Pole
Q-G3590	Mini Double Pole
Q-OA32	Orient D/P Changeover
Q-G3696	Midget Double Pole Changeover
Q-RC99	Midget 4-Pole Changeover
	TOGGLE SWITCH
Q-RC46	Single Pole
	PUSH-BUTTON SWITCHES
Q-RC43	Single Pole Push/Make (GREEN)
Q-RC44	Single Pole Push/Break (RED)
Q-RC45	Single Pole Push/On Push/Off (WHITE)
Q-RC49	Double Pole Push/Make (BLACK)

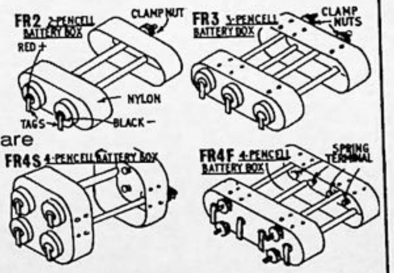
PRESS STUDS (pair)

Q-RC56	Large
Q-RC57	Small
Q-G3695	Small Deluxe



BATTERY BOXES

	FUTABA
Q-FR2	2-Cell
Q-FR3	3-Cell
Q-FR4F	4-Cell Flat
Q-FR4S	4-Cell Square
Q-FR2/1	Nuts only (pkt 4)


FR2 2-PENCELL BATTERY BOX
CLAMP NUT
RED +
NYLON
TAGS
BLACK -
FR3 3-PENCELL BATTERY BOX
CLAMP NUTS
FR4S 4-PENCELL BATTERY BOX
FR4F 4-PENCELL BATTERY BOX
SPRING TERMINAL

HEATSHRINK TUBE (pkt)

Q-HST1	1/16" dia
Q-HST2	3/32" dia
Q-HST3	1/8" dia

MISCELLANEOUS ACCESSORIES

Q-U211/754	Mounting Collet for Wire Aerial
Q-RC20	Vibrasorb Grommets (pkt 20)
Q-FK124	Crocodile Clips (pair)

ABOUT WIRING

Only STRANDED flex should be used for wiring. This has less electrical resistance than 'solid' wires - and is far stronger mechanically. Ripmax SUPERLITE FLEX is 14-strand - the top specification - with plastic insulation in nine different colours.

All connections made with flex must be soldered. Use an electric soldering iron and resin cored flux (NEVER use an acid type flux on electrical joints). Insulation must be stripped carefully off the ends of the flex, taking care not to cut through any of the strands of wire. Do not handle the bared wire with fingers.

Apply the tip of the iron to one side of the terminal. Hold the wire on the other side and touch with solder. Remove the iron immediately the solder runs. Do not get an excess of solder on the joint.

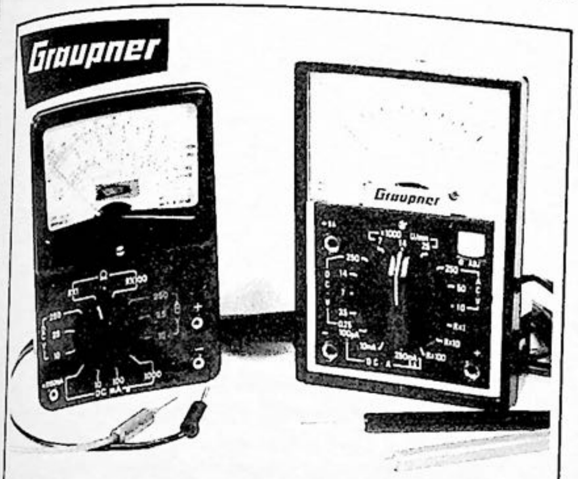
A good joint will look bright and smooth. A dull solder joint with a crystalline appearance should be remade.

WIRE FLEX

SUPERLITE FLEX (14 STRAND)	
Q-RC71	Red
Q-RC72	Black
Q-RC73	Blue
Q-RC74	Yellow
Q-RC75	White
Q-RC76	Green
Q-RC77	Orange
Q-RC78	Brown
Q-RC79	Grey

Note: All the above are sold by the yard

METERS
SOLDERING IRONS



The GRAUPNER DE LUXE MULTIMETER provides accurate electrical measurement in the following ranges:

DC voltages	- 0-3.5, 7, 14 and 250
AC voltages	- 0-10, 50, 250 and 1000
DC milliamps	- 0-10, 500 and 5 amps
Resistance	- 0-2 and 0-200 kilohms
Dimensions:	5 1/8" x 3 9/16" x 1 7/8"
Weight:	approximately 14 ounces

Even greater scope is provided by the REV COUNTER/MULTIMETER which, as well as (similar) measurement ranges, can also be used as an ELECTRONIC TACHOMETER, reading light reflected from/through the prop. Rpm ranges 0-7000, 0-14000 and 0-25000. A really advanced multi-purpose instrument for the serious modeller.

ELECTRICAL METERS

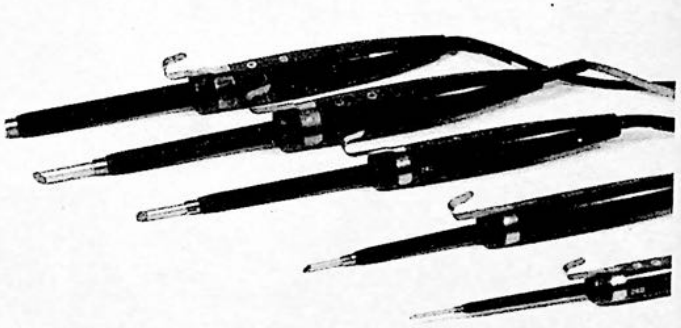
R-G3506	Electronic Rev Counter/Multimeter
R-G3535	Graupner Deluxe Multimeter

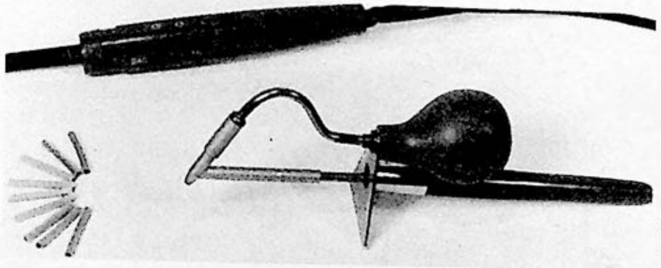
LITESOLD/ADAMIN SOLDERING IRONS

	LITESOLD PRODUCTION
R-LS50	12v 10w 3/32 Bit
R-LS51	240v 10w 3/32 Bit
R-LS52	240v 20w 9/64 Bit
R-LS53	240v 25w 3/16 Bit
R-LS54	240v 30w 1/4 Bit
R-LS55	240v 35w 5/16 Bit
R-LS56	240v 60w 13/32 Bit

LITESOLD COPPER BITS

R-LS51/1	3/32"	R-LS52/1	9/64"
R-LS53/1	3/16"	R-LS54/1	1/4"
R-LS55/1	5/16"	R-LS56/1	13/32"





	CONQUEROR
R-LS60	General Purpose 12v 1/8" Bit
R-LS61	General Purpose 240v 1/8" Bit
R-LS61/10	DeSoldering Attachment
R-LS61/11	Spare DeSoldering Filters (pkt 10)

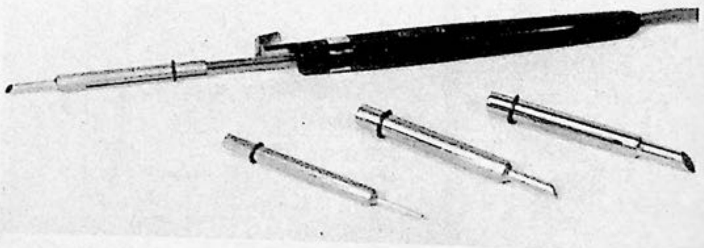
CONQUEROR COPPER BITS

R-LS61/1	1/16"	R-LS61/2	3/32"
R-LS61/3	1/8"	R-LS61/4	3/16"
R-LS61/5	1/4"		

	ADAMIN
R-LS70	Miniature 12v 15w 3/32 Bit
R-LS71	Miniature 240v 15w 3/32 Bit
R-LS80	Hobby Pack 12v 15w & 5 Bits
R-LS81	Hobby Pack 240v 15w & 5 Bits

ADAMIN COPPER BITS

R-LS71/1	3/64"	R-LS71/2	1/16"
R-LS71/3	3/32"	R-LS71/4	1/8"
R-LS71/5	3/16"		

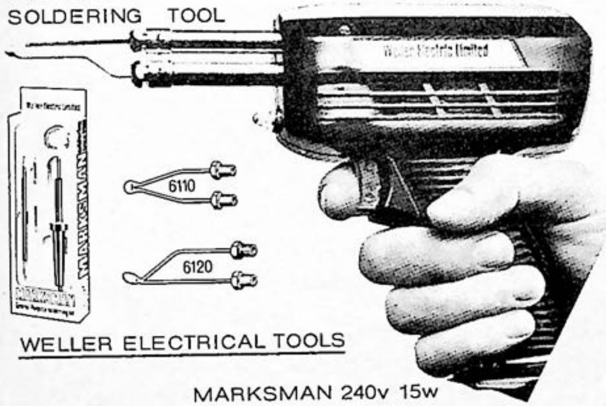


CHOOSING A SOLDERING IRON...

Use a MAINS VOLTAGE soldering iron for all soldering jobs in your workshop. A 12 volt iron is mainly intended for field or 'emergency' use. For general electrical soldering work use a 1/8" bit. When working on printed circuits, use a 3/32" or 1/16" bit. For heavier soldering work - soldering steel wire and metal parts, for example, use a large size bit. Recommended choice for wattage is: 10 watts for small jobs or intermittent use, 20 or 25 watts for general electrical soldering, 30 or 35 watts for general soldering, 36 or 60 watts for soldering steel wire, and larger work.

ELECTRICAL TOOLS
WELLER, HEATHCRAFT, DREMEL

THE 'INSTANT HEAT'
SOLDERING TOOL

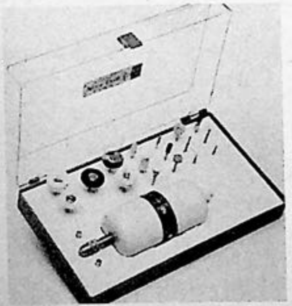


WELLER ELECTRICAL TOOLS

	MARKSMAN 240v 15w
R-WSP15D	Soldering Iron
R-WMT8	Copper Bit
	MARKSMAN 240v 25w
R-WSP25D	Soldering Iron
R-WSP25DK	Soldering Iron Kit
R-WMT4	Copper Bit
R-W2400DK	Glue Gun Kit 240v
R-W2400/1	" " Glue Sticks
R-W2400/2	" " Caulk Sticks
R-W8200D	Dual-Heat Soldering Gun
R-W8200DPK	" " Gun Kit
R-W7135	Gun Soldering Tip only (2)
R-W6110	" Cutting Tip only
R-W6120	" Smoothing Tip only

100/140w

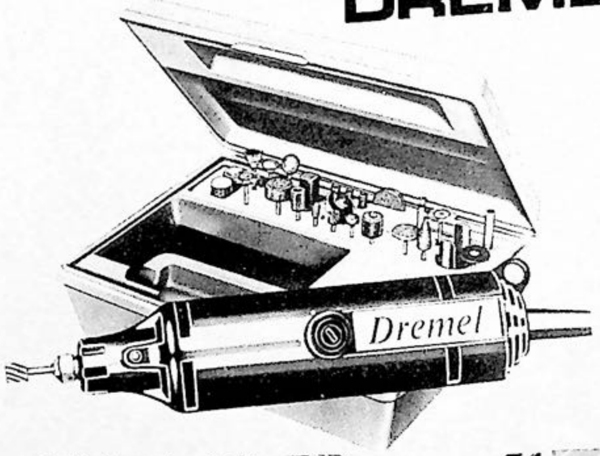
HEATHCRAFT MINI-DRILL KITS (with tools)



Compact power tool running off standard dry batteries or mains (via Battery Eliminator) Fitted collet-type chuck plus brushes, grinding points and burrs.

R-HM1	Standard Kit
R-HM2	Super kit
R-HM2D	Super De Luxe Kit
R-HM30	Battery Eliminator Transformer (12v)

DREMEL MOTO-TOOL



Every Dremel Moto-Tool kit contains 34 accessories including high-speed cutters, emery and silicon grinding wheels and points, wire and bristle brushes, felt and rubber polishing tips, sanding discs, drum sanders and sanding bands, mandrels, dressing stone, finger grip extension, collets - in plastic cases. Everything you need for home, hobby and craft work, model and pattern making.

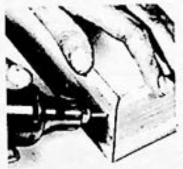
MOTO-TOOL DRILL KIT

R-T259	Modellers (240 volt motor)
R-T281	Industrial (Heavy Duty 110v)

MOTO-TOOL ACCESSORIES

R-T229	Router Attachment only
R-T600	Router Bit Set (6 pieces)
R-T400	Heavy Duty Saw (pkt 3)
R-T406	Light Duty Saw (pkt 3)
R-T408	Coarse Sander Band (pkt 12)
R-T432	Fine Sander Band (pkt 12)
R-T409	Emery Cutting Wheel (pkt 36)

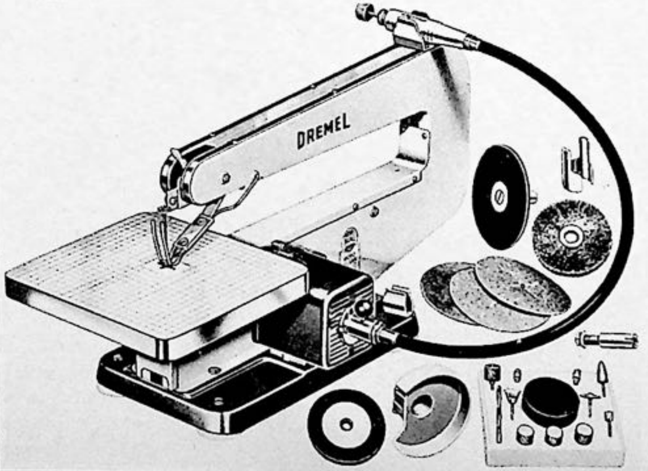
PRECISION ROUTING


DRILLING HOLES

DEBURRING & REFINISHING

SANDING SMALL AREAS

DREMEL JIGSAW



15-inch jigsaw with power take-off which converts it to a bench grinder, disc sander or buffing wheel. Plus a flexible shaft attachment which can be used for drilling, routing, grinding, etc. Think of the benefits of the jigsaw alone - accurate, fast cutting-out of balsa sheet parts, ply, light metals, plastics, etc. Table also tilts for bevel cuts. Disc sander is ideal for rough and final shaping, etc. The Dremel is a precision-made multi-purpose tool.

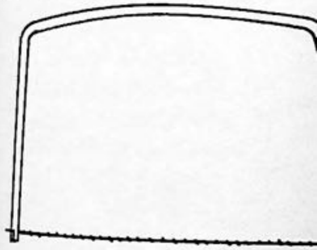
MOTO-SHOP JIGSAW with Disc Sander only - cat no R-T571

R-T573	Grindstone & Flexishaft Kit
R-T575	Grindstone & Adaptor only
R-T8029	Fine Tooth Saw Blade (pkt 5)
R-T8030	Coarse Tooth Saw Blade (pkt 5)
R-T571/1	Spare Motor for Jigsaw

BBS 20 MODEL BANDSA
soft woods, and 1" in bra
14" sawtable with 12" thr
cast aluminium main fran
Blade speed 420 ft/min.
width 14", height 22", w

BURGESS BANDSAW c
with G/P Blade - R-BBS

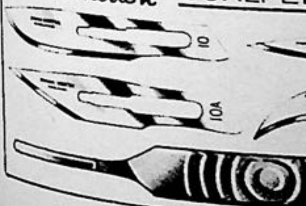
	ACCESSOR
R-B005100	Adjustable
R-B014500	Plain Fabri
R-B014508	Wood Cutti
R-B014514	General Pu
R-B014524	Medium-To Cutting Bla
R-B014532	Fine-Tooth Cutting Bla



SCHUCO HANDTOOLS

R-U243/371	M4 (7mm
R-U243/372	Glowplug

Swann-Morton SCALPE



O-TOOL

l kit contains 34 accessories
cutters, emery and silicon
nts, wire and bristle brushes,
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bands, mandrels, dressing
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_ DRILL KIT
odellers (240 volt motor)
lustrial (Heavy Duty 110v)

_ ACCESSORIES
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avy Duty Saw (pkt 3)
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arse Sander Band (pkt 12)
e Sander Band (pkt 12)
ery Cutting Wheel (pkt 36)

IEL JIGSAW

th power take-off which
ch grinder, disc sander or
a flexible shaft attachment
r drilling, routing, grinding,
enefits of the jigsaw alone-
ng-out of balsa sheet parts,
plastics, etc. Table also
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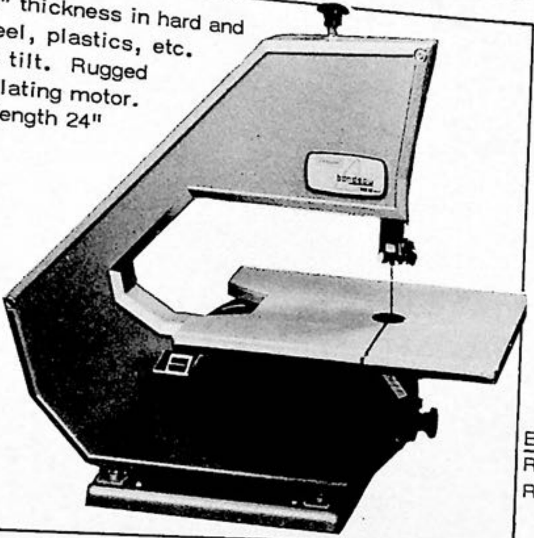
W with Disc Sander only -
ne & Flexishaft Kit
ne & Adaptor only
th Saw Blade (pkt 5)
ooth Saw Blade (pkt 5)
otor for Jigsaw

BURGESS SWANN-MORTON

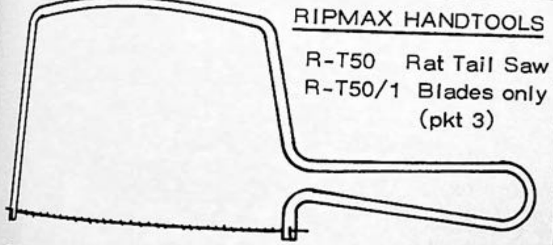
BBS 20 MODEL BANDSAW cuts up to 3" thickness in hard and soft woods, and 1" in brass, copper, steel, plastics, etc. 14" sawtable with 12" throat. 45 degree tilt. Rugged cast aluminium main frame. Self-ventilating motor. Blade speed 420 ft/min. Dimensions: length 24" width 14", height 22", weight 33lb.



BURGESS BANDSAW complete with G/P Blade - R-BBS20

ACCESSORIES

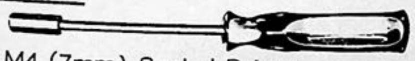
R-B005100	Adjustable Fence
R-B014500	Plain Fabric Cutting Blade
R-B014508	Wood Cutting Blade
R-B014514	General Purpose Blade
R-B014524	Medium-Tooth Metal Cutting Blade
R-B014532	Fine-Tooth Metal Cutting Blade



RIPMAX HANDTOOLS

R-T50	Rat Tail Saw
R-T50/1	Blades only (pkt 3)

SCHUCO HANDTOOLS



R-U243/371	M4 (7mm) Socket Driver
R-U243/372	Glowplug (8mm) Socket Driver

DAVID 4 MINI PLANE

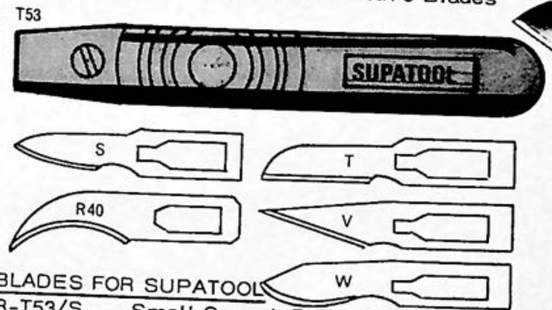
To work any kind of wood, such as chip board, block board, etc. Also to work: hardboard, softboard, formica, plastic, leather, rubber, linoleum, etc.

DAVID-4 MINI PLANE

with Blades	R-T4
Blades only (pkt 5)	R-T4/1

SWANN-MORTON HANDTOOLS

R-T51	Craft Tool Knife with 2 Blades
R-T52	Unitool Knife with 3 Blades
R-T53	Supatool Knife with 5 Blades



BLADES FOR SUPATOOL

R-T53/S	Small Curved	R-T53/T	Straight
R-T53/R40	Hooked	R-T53/V	Angled
		R-T53/W	Large Curved

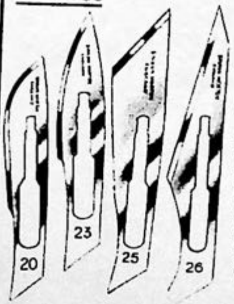
BLADES FOR CRAFT TOOL

R-T51/1	Angled
R-T51/2	Curved
R-T51/3	Hooked

BLADES FOR UNITOOL

R-T52/A	Angled
R-T52/B	Curved
R-T52/D	Straight

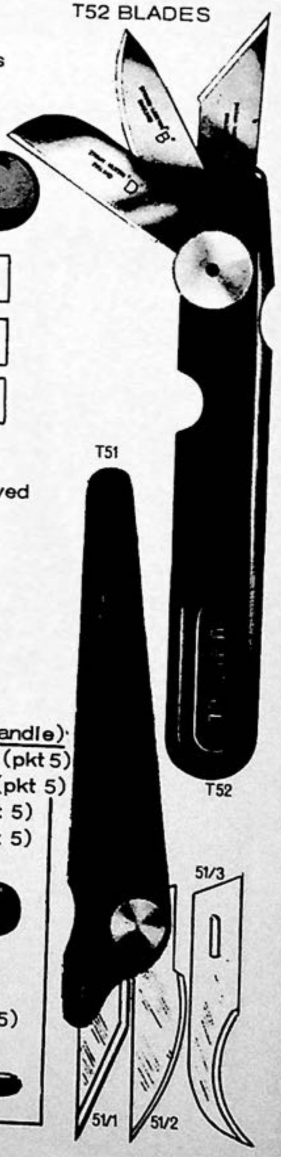
BLADES FOR T55



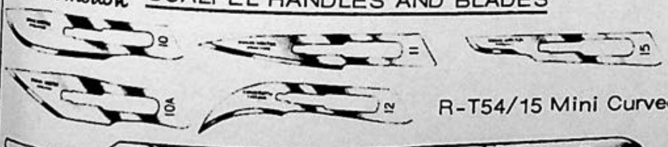
BLADES FOR T55 (No.4 Handle)

R-T55/20	Standard Curved (pkt 5)
R-T55/23	Shallow Curved (pkt 5)
R-T55/25	45° Angled (pkt 5)
R-T55/26	15° Angled (pkt 5)

T52 BLADES



Swann-Morton SCALPEL HANDLES AND BLADES



R-T54/15 Mini Curved

BLADES FOR T54 & SJ (No.3 & 5 Handles) Pkt 5

R-T54/10	Large Curved	R-T54/10A	30° Angled
R-T54/11	15° Angled	R-T54/12	Hooked

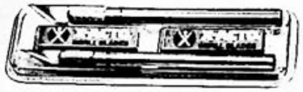
SCALPEL HANDLES

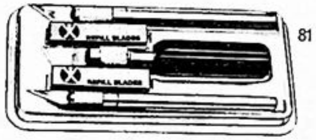
R-T54	Small (No.3)
R-T54SJ	Slim Jim (No.5)
R-T55	Large (No.4)

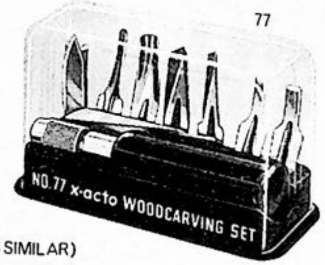
KNIFE & TOOL SETS

51

52

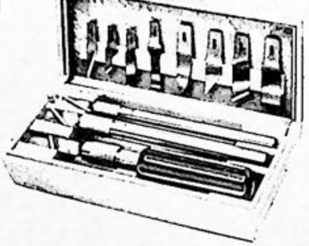

62

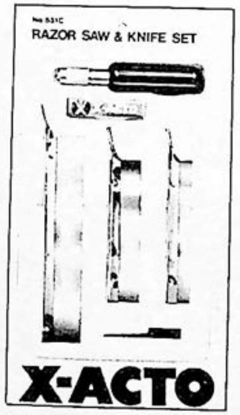

81

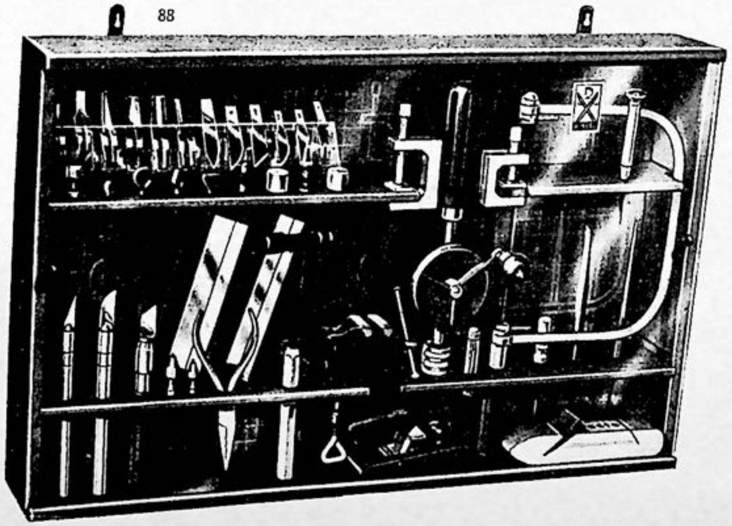

77

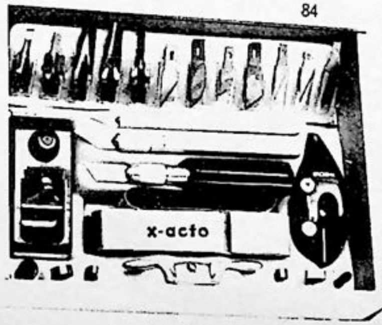
75

79

82(83 SIMILAR)


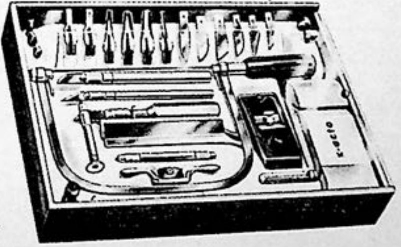
531


88



84

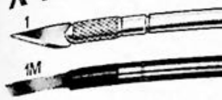
R-X51C/ST	NO.1 KNIFE SET with 5 extra assorted blades
R-X52C/ST	NO.2 KNIFE SET with 5 extra assorted blades
R-X62&62C	DOUBLE KNIFE SET No.1 & 2 knives with 10 blades.
R-X75	LEADER CARVING CHEST No.5 handle, 7 assorted regular blades, 6 gouges, 4 routers. In wood chest.
R-X77	WOODCARVING SET No. 5 handle, assorted blades & 6 gouges. Plastic case with clear top.
R-X79C	CARVING TOOL SET Straight chisel, bent chisel, skew bevel chisel, bent gouge, U-tool & veining tool.
R-X81&81C	TRIPLE KNIFE SET Nos.1,2 & 5 knives & 10 extra blades.
R-X82&82C	TRIPLE KNIFE CHEST Nos.1,2 & 5 knives & blades in wood chest.
R-X83&83C	DE LUXE TRIPLE KNIFE CHEST Nos.1,2 & 6 knives & 18 assorted blades.
R-X84	KNIFE & TOOL SET Nos.1,2 & 5 handles, assorted blades, planer, sander, spokeshave & balsa stripper.
R-X85	KNIFE & TOOL DE LUXE SET Nos. 1,2 & 6 handles, assorted blades, punches, gouges, etc. plus planer, sander, saws, spokeshave, pin vice, etc.
R-X86	KNIFE & TOOL BURLINGTON CHEST Nos.1,2 & 5 knives, assorted blades, punches, gouges, etc. plus planer, sander, stripper, rule, spokeshave.
R-X87	KNIFE & TOOL DE LUXE CHEST Nos.1,2 & 6 knives, gouges, routers, punches, steel rule, pin vice, etc.
R-X88N	KNIFE & TOOL CABINET Nos.1,2 & 5 handles, asstd. blades, routers, punches, saws, tweezers, pliers, drill, vice, sander planer, pin vice, clamps, hammer (with extra heads).
R-X531C	RAZOR SAW & KNIFE SET No.5 handle, No.035, 35 & 34 saw blades, no.15 keyhole saw blade & 5 knife blades.

CODING NOTE: re alternative packaging
C = bubble pack; ST = tube pack.

85(87 SIMILAR)


86

X-ACTO KN

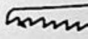


R-X1C & ST No.
For I
R-X1MC&ST No.
R-X2C & ST No.2
For r
R-X3C & ST PEN
R-X4C & ST STE
R-X5C & ST No.5
With
R-X6C & ST No.6
R-X8RC UTIL
R-X9RX & C RETF
R-X66C POC
Coding Note: C =

#12 correction blade — stencils.

#19 deburring; chisel ing; rough shaping.

#26 trim excess flash; whi


#27 — 3" Saw

#28 hooked for curved shaping, whittling;

5 extra assorted blades
5 extra assorted blades
o.1 & 2 knives with 10 blades.
EST No.5 handle, 7 assorted
s, 4 routers. In wood chest.
No. 5 handle, assorted blades
se with clear top.
traight chisel, bent chisel, skew
e, U-tool & veining tool.
s.1,2 & 5 knives & 10 extra blades.
Nos.1,2 & 5 knives & blades in

E CHEST Nos.1,2 & 6 knives &

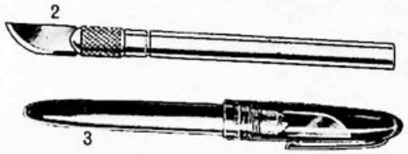
s.1,2 & 5 handles, assorted
spokeshave & balsa stripper.
E SET Nos. 1,2 & 6 handles,
es, gouges, etc. plus planer,
ve, pin vice, etc.
STON CHEST Nos.1,2&5 knives,
s, gouges, etc. plus planer,
spokeshave.
CHEST Nos.1,2 & 6 knives,
s, steel rule, pin vice, etc.
Nos.1,2 & 5 handles, asstd.
s, saws, tweezers, pliers,
r, pin vice, clamps, hammer

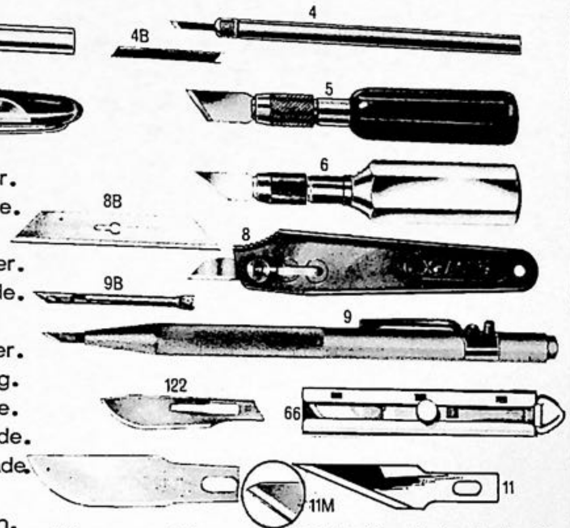
ET No.5 handle, No.035, 35
keyhole saw blade & 5 knife

packaging
ube pack.

X-ACTO

-ACTO KNIVES





1C & ST No.1 KNIFE aluminium handle 5" long 5/16" diameter. For light to medium work. Complete with No.11 blade.
1MC&ST No.1 KNIFE with microsaw (saw edge blade).
2C & ST No.2 KNIFE aluminium handle 5" long 7/16" diameter. For medium to heavy work. Complete with No.22 blade.
3C & ST PEN KNIFE clips to pocket. With No. 10 blade.
4C & ST STENCIL KNIFE aluminium handle 5" long ¼" diameter.
5C & ST No.5 KNIFE for heavy work. Plastic handle 4¾" long. With metal blade lock. Complete with No. 19 blade.
6C & ST No.6 KNIFE for extra heavy work. Comes with No.24 blade.
8RC UTILITY KNIFE 5 3/8" long, steel handle, reversible blade.
9RX & C RETRACTABLE KNIFE for any delicate close work.
66C POCKET KNIFE stainless steel, push-button operation.
ng Note: C = bubble pack ST = tube pack.

#10 eraser; correct stencils; fine general cutting; carving.

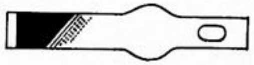
#11 fine angle cutting; stripping; trimming-potting compounds, excess flashing; correct printed circuits; clean excess solder; gasket cutting; deburring.

#12 correction blade – stencils.

#13 precision saw cutting – plastics.

#14 circle cutting; straight, vertical cuts.

#16 stencils; scoring; etching; small holes, notches.

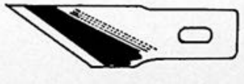

#17 ¼" chisel blade for narrow cuts.

#18 ½" chisel blade for deep cross cuts.

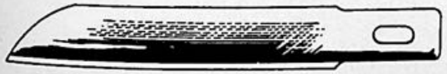
#19 deburring, chiseling; rough shaping.

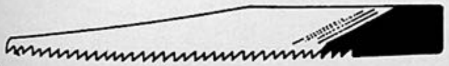
#22 trimming – potting compounds, excess flashing; eraser; long cuts; close corner cutting; whittling.

#23X double edged; close quarter; angled corners; trimming and dressing potting compounds; stripping.

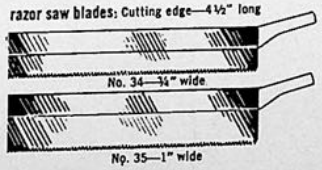

#24 close corner cuts – templates, mats; deburring; trimming; stripping; trim potting compounds; gasket cutting.

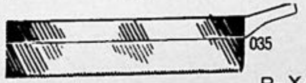
#25 trimming – potting compounds, excess flashing; heavy cutting; general carving; whittling.


#26 trim excess flash; whittling


#27 – 3" Saw

razor saw blades: Cutting edge—4½" long


No. 34—¾" wide
No. 35—1" wide



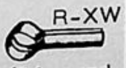
#15 Keyhole Saw Blade.

#28 hooked for curved shaping, whittling:

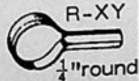
No. 31
3/16" Punch

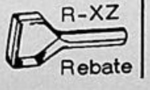
No. 32
1/2" Punch

ROUTERS for carving out grooves, hollows & recesses


R-XW
1/8" round

R-XX
diamond


R-XY
¼"round


R-XZ
Rebate

REFILL BLADES - number of blades is shown ( ).

R-X4B	•	Stencil Knife	(5)	knife	4 only
R-X8B	•	Utility Knife	(5)	"	8 only
R-X9B	•	Retractable Knife	(5)	"	9 only
R-X10	•	Medium Curved	(5)	"	1 & 3
R-X11	•	30° Angled	(5)	"	1 & 3
R-X11M	•	30° Angled Modified	(5)	"	1 & 3
R-X12	•	Small Curved	(5)	"	1 & 3
R-X13	•	Micro Saw	(5)	"	1 & 3
R-X14	•	Double Angled	(3)	"	1 & 3
R-X15	•	Keyhole Saw Blade	(3)	"	5 only
R-X16	•	Stepped Angled	(5)	"	1 & 3
R-X17	•	Small Chisel	(5)	"	1 & 3
R-X18	•	Large Chisel	(5)	"	2 & 5
R-X19	•	50° Angled	(5)	"	2 & 5
R-X22	•	Large Curved	(5)	"	2 & 5
R-X23X	•	Double Curved	(5)	"	2 & 5
R-X24	•	40° Angled	(5)	"	2 & 5
R-X25	•	Shallow Curved	(5)	"	2 & 5
R-X26	•	Whittling	(3)	"	5 only
R-X27	•	3" Saw	(3)	"	5 only
R-X28	•	Hooked	(5)	"	5 only
R-X29		Block Planer	(2)		
R-X30		Spokeshave	(2)		
R-X31		3/16" Punch	(1)	knife	5 & 6
R-X32		1/2" Punch	(1)	"	5 & 6
R-X34C		3/4" Razor Saw	(1)	"	5 only
R-X35C		1" Razor Saw	(1)	"	5 only
R-X035C		1¼" Razor Saw	(1)	"	5 only
R-X43R/2		Jewellers Saw No.2	(10)		
R-X43R/3		Jewellers Saw No.3	(10)		
R-X43R/5		Jewellers Saw No.5	(10)		
R-X44R		Hobbycraft Coping Saw	(5)		
R-X44S		Hobbycraft Spiral Saw	(3)		
R-X122	•	Pocket Knife	(2)	knife	66 only
R-X1AS	•	No.1 Blade Assortment	(5)		
R-X2AS	•	No.2 Blade Assortment	(5)		
R-X4AS	•	No.4 Gouge Assortment	(5)		
R-X5AS	•	No.5 Router Assortment	(4)		
R-X6AS	•	No.6 Punch Assortment	(2)		

• = also available in bubble pack.

R-XA

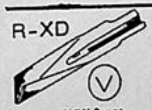
3/16" Chisel

R-XB

¼" Chisel

R-XC

3/16" V Gouge

R-XD

⅜" V Gouge

R-XE

⅜" U Gouge

R-XF

3/32" U Veiner

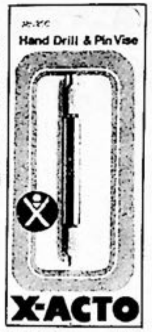
X-ACTO TOOLS

RIPMAX

R-XOC - Pinpoint Leakproof Oiler. Does delicate oiling jobs quickly, easily neatly. Can't drip or leak. The slim cylinder and extra long pinpoint nozzle enable you to reach hard-to-get-at places.

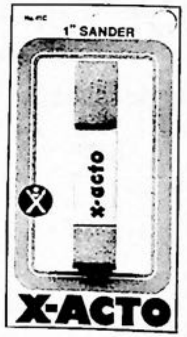
CARBON TWIST DRILLS

R-X9DC	Nos. 55-80 drill set (12 pieces)
R-X10DC	Nos. 45-60 drill set (12 pieces)
R-X11DC	1/16"-3/16" drill set (9.pcs)
R-X12DC	Vizidome drill set (20 pieces)

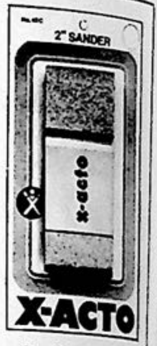


R-X21DC Hand Drill & Pin Vice (3¾" long) Takes 45-80 drills.

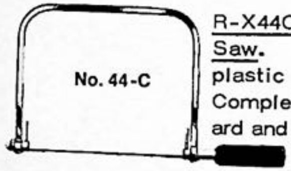
R-X40C
Block Planer



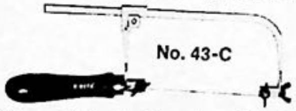
R-X41C
1" Sander



R-X42C
2" Sander

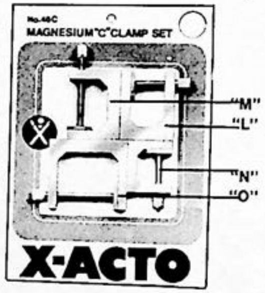


R-X44C - Hobbycraft Saw. Steel frame, plastic handle 11". Complete with 2 standard and 2 spiral safety blades.

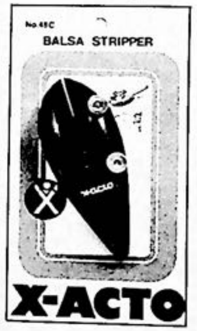


R-X43C - Adjustable Jeweller's Saw Made of fine quality steel. Adjustable frame enables continued use of saw blades that snap. Saws in any direction.

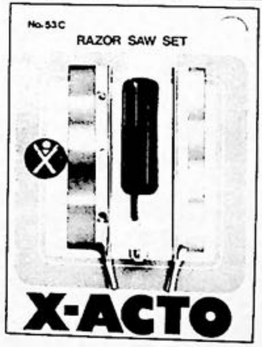
R-X45C
Spoke Shave
Weight 8 oz.



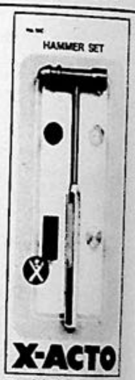
R-X46C C-Clamp Set
4 clamps.



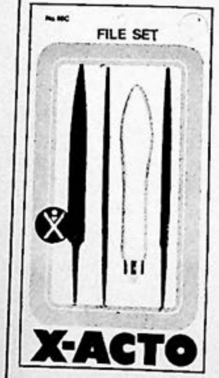
R-X48C
Balsa Stripper
Weight 1lb 4oz



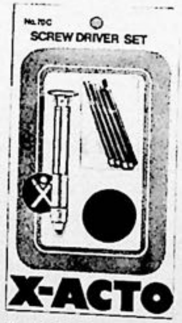
R-X53C
Razor Saw Set
No 5 handle & one each of No 34 & 35 saw blades



R-X50C
Hammer Set
Weight 2lbs 7oz



R-X60C	File Set with Handle
R-X60SC	Needle File Set 12 assorted styles.



R-X70C	Screwdriver with 5 Blades. Aluminium handle & chuck.
R-X321DC	Drill Chuck Set for drill sizes 45-80 & pin vice with interchangeable standard handle.

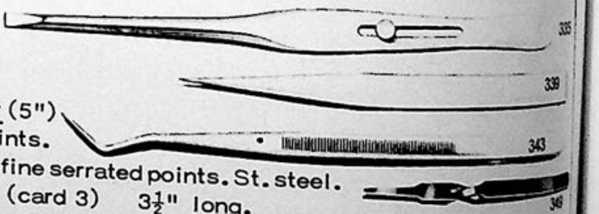
TWEEZERS

R-X335C Slide Lock (6½") For soldering. Nickel plated steel.

R-X339C Watchmaker (5") Bevelled hardened points.

R-X343C Angled (6") fine serrated points. St. steel.

R-X349C Heat Sink (card 3) 3½" long. Aluminium to quickly dissipate heat when soldering small wires.

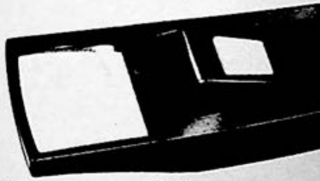


RIPM

R-X351 - Contoured Sa
different sanding hea
handles, scientifically
those areas other sa

Include
cut she
FLEX -

R-X532
Saw Se
inium n
razor sa
handle.
R-X533

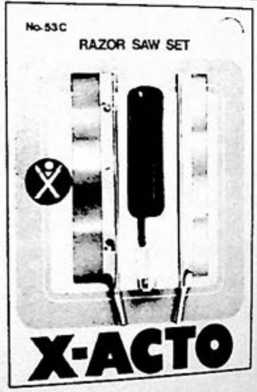


R-X371NC
Illuminating Magnifier. A
instrument for critical in
illuminated by a small bu
light, it eliminates sha
brings out the detail of any

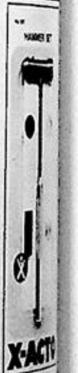
-X40C
ock Planer

R-X41C
1" Sander

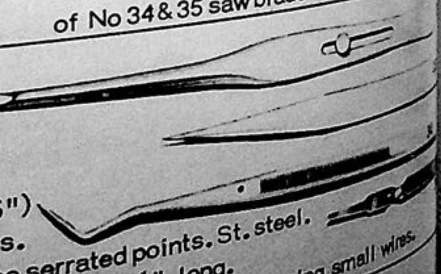
R-X42C
2" Sande



R-X53C
Razor Saw Set
No 5 handle & one each
of No 34 & 35 saw blades



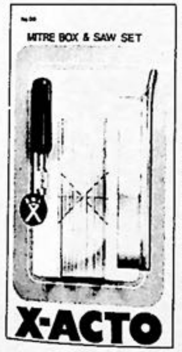
R-X50C
Hammer S
Weight 2



5")
s.
e serrated points. St. steel.
card 3)   3½" long.
inate heat when soldering small wires.

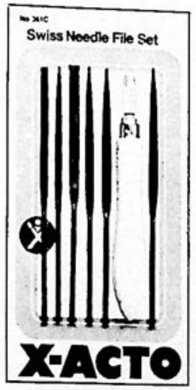
X-ACTO TOOLS

R-X351 - Contoured Sanders Set offers five different sanding heads with grip-tight handles, scientifically designed to get into those areas other sanders can't reach. Includes assortment of pre-cut sheets of plastic-backed FLEX-I-GRIT sandpaper.



R-X532C Mitre Box and Saw Set contains aluminium mitre box No. 035 razor saw blade & No. 5 handle.

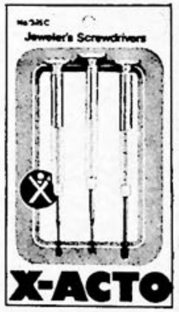
R-X533C Mitre Box only

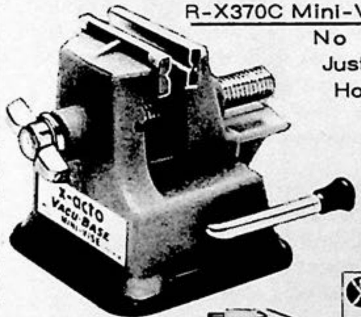


R-X360C - Universal File Handle. Accommodates all files.

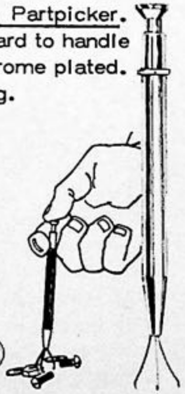
R-X361C Needle File Set with Handle Six different file styles with quick change, comfort-grip handle.

R-X365C - Jewellers Screwdriver Set (3 pieces). Swivel driver head and aluminium handle. Sizes .055, .070 & .100

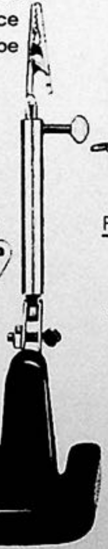




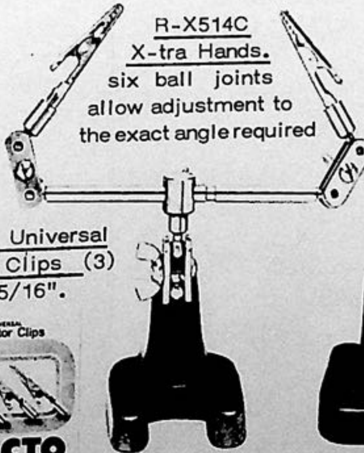
R-X370C Mini-Vacu Vice
No screws.
Just flip lever
Holds tight
instantly.



R-X380C - Partpicker. For those hard to handle pieces. Chrome plated. 4 1/8" long.



R-X513C X-tra Hand. Holds work firmly in any position leaving hands free. Double-ball joint allows adjustment at any angle. Heavy iron base prevents tipping; can be held in vice or clamped to bench. Alligator-type spring clip replaceable.

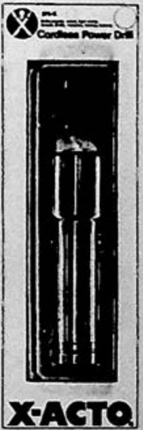


R-X514C
X-tra Hands.
six ball joints
allow adjustment to
the exact angle required

- Compact
- Efficient
- Stainless Steel Constr.
- Heat Resistant Handle
- Featherweight

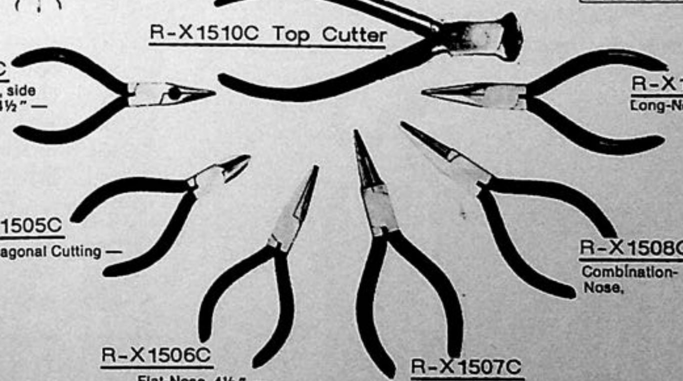
R-X378C Soldering Iron & Hot Knife (25w) Hold and use as a pencil. Hot knife cuts through plastics rapidly and accurately.

R-X376C - Cordless Power Drill Set. Drills metals & plastics. Complete with three precision collets, drill bit, centre punch and grinder.



R-X371NC
Illuminating Magnifier. An ideal instrument for critical inspection illuminated by a small but powerful light, it eliminates shadows and brings out the detail of any object.

R-X515C Universal Alligator Clips (3) opens to 5/16".



R-X1510C Top Cutter

R-X1504C
Long-Nose, side cutting — 4½" —

R-X1509C
Long-Nose, 4½" –

R-X1505C
Diagonal Cutting —

R-X1508C
Combination-Nose,

R-X1506C
Flat-Nose, 4½" —

R-X1507C
Snipe-Nose, 4½" —

HAND TOOLS FILES, SPANNERS

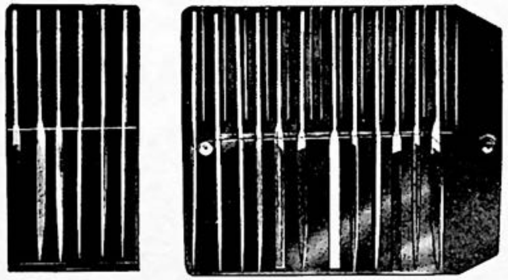
"BEDFORD HAND TOOLS"

These top quality tools are specially made in modellers' sizes from the finest materials. Files are precision cut and hardened. Spanners are of high-tensile steel, chromium plated for durability. Files and spanners are available individually .... or in sets.

TOOL SETS

NEEDLE FILES

R-B1	Miniroll Small (6 pieces)
R-B3	Miniroll Large (6 pieces)
R-B4	Handiroll Large (12 pieces)

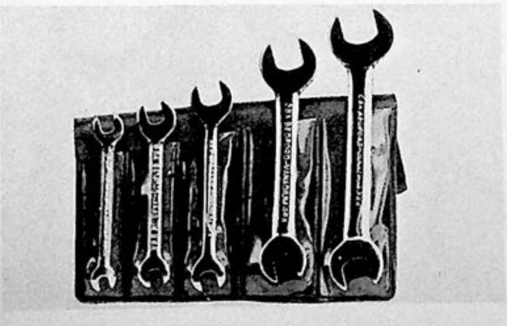


BA SPANNER SET

R-B11	3-Piece (2,4,6 & 8BA)
R-B12	5-Piece (0,2,4,6,8 & 10BA)

BA RINGSPANNER SET

R-B13	3-Piece (0,2,4 & 6BA)



INDIVIDUAL TOOLS

SMALL NEEDLE FILES
5" LONG

R-B21	Taper Flat
R-B22	Hand Flat
R-B23	Half Round
R-B24	Round Crossing
R-B25	Three Square
R-B26	Knife Wedge
R-B27	Square
R-B28	Round

LARGE NEEDLE FILES
6" LONG

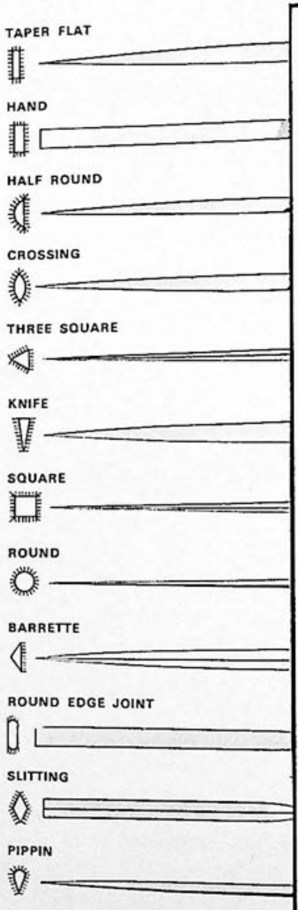
R-B31	Taper Flat
R-B32	Hand Flat
R-B33	Half Round
R-B34	Round Crossing
R-B35	Three Square
R-B36	Knife Wedge
R-B37	Square
R-B38	Round
R-B39	Barrette Flat
R-B40	Round Edge
R-B41	Slitting Diamond
R-B42	Pippin Wedge

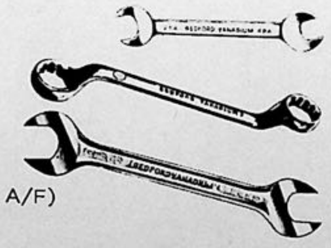
OPEN ENDED SPANNERS

R-B51	0BA-2BA
R-B52	2BA-4BA
R-B53	4BA-6BA
R-B54	6BA-8BA
R-B55	8BA-10BA

RINGSPANNERS

R-B61	0BA-2BA
R-B62	2BA-4BA
R-B63	4BA-6BA
R-B70	Prop Nut Spanner (¼" UNF or 7/16" A/F)





USING FILES

Remember, a file is designed to be used for filing. Not for opening tinlets, cans, or any other odd jobs. Files are not intended to take bending loads and if you use them as 'levers' they are bound to snap!

Needle files should also be used with care. Many have extremely sharp points, as well as sharp cutting edges. Clamp or support the workpiece securely (although in some cases it may be necessary to hold it in the hand). Keep the free hand clear of the movement of the file.

Needle files are normally used one-handed. The cut can be made with a continuous to-and-fro movement, or just a 'push' stroke, as most convenient (most files only cut efficiently on a 'push' stroke). If both ends of the file are held for support (e.g. when enlarging a hole with the workpiece clamped vertically in a vice), avoid applying bending loads on files.

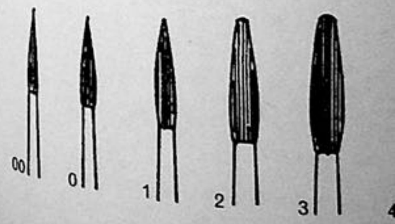
Keep separate files for use on soft materials, such as aluminium or copper. Once used on these materials the cutting surface will become 'smeared' and partly filled in. Such a file will not cut properly on steel or a harder surface - and will be difficult or impossible to clean.

The same when filing plastics. The plastic will tend to clog the file. In this case, though, the file can usually be cleaned with a wire brush.

All the file shapes have their particular use, but you will soon find your favourites. Lay in a reserve stock of two or three of each of these. Then if a favourite file gets clogged, or broken, you have an immediate replacement on hand. There is nothing like a new, sharp file for good, accurate work!

CHOOSIN

Choose the right type - and
hand. It will make the work e
For brushing a clear dope -
MOP brush. This will make it
uniformly over the surface.
applying grain filler too, but w
so that you can brush into the s
also good for this type of work.
applying colour finishes, too, a
the thickness of coating. The bi
the wider the brush you can u
ARTIST PENCIL BRUSHE
colour doping stripes, etc, bet
in twelve sizes. The wider the
the brush you should use. Do
colouring over large areas. It
thickness of coating (and the j
do).
For lining, painting betwee
filling in outlines in solid colo
always prefer a SIGNWRITING
modellers may find these more
brush - but with practice, resu
a certain 'natural' skill to ac
work. Especially for freehan
BRUSH) and cutting in (with
Look after your brushes.
thinners after use. Keep s
finishes and WHITE (a brush
discolour clear or white dopes
out clean). And once any bru
or bristles coming out) relega
grain filler application.



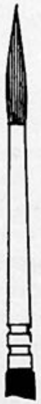
CHOOSING A BRUSH

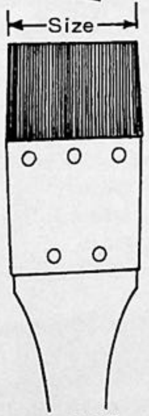
Choose the right type - and size - of brush for the job in hand. It will make the work easier and give better results. For brushing a clear dope - or fuel proofer - use a soft MOP brush. This will make it easy to 'float' the coating uniformly over the surface. Some people use a MOP for applying grain filler too, but we think a FLATTIE better here, so that you can brush into the surface. A BRISTLE brush is also good for this type of work. A FLATTIE is the brush for applying colour finishes, too, as it will give you control over the thickness of coating. The bigger the surface being painted, the wider the brush you can use to speed the work.

ARTIST PENCIL BRUSHES are for smaller work, like colour doping stripes, etc, between masking tape. They come in twelve sizes. The wider the area to be painted the bigger the brush you should use. Do not use an artist brush when colouring over large areas. It will be difficult to get an even thickness of coating (and the job will take longer than it need do).

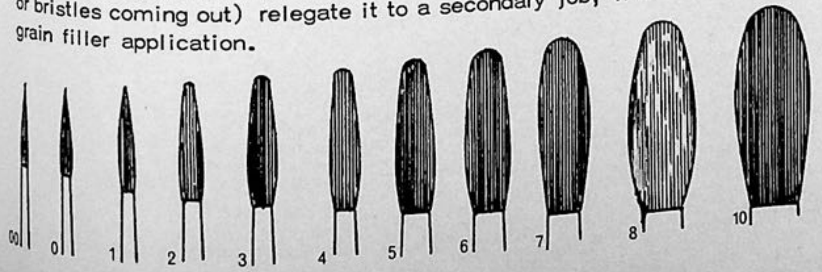
For lining, painting between masking tape patterns, or filling in outlines in solid colours, the 'professional' would always prefer a SIGNWRITING BRUSH. Less experienced modellers may find these more difficult to use than an artist brush - but with practice, results are better. But you need a certain 'natural' skill to achieve top class professional work. Especially for freehand lining work (with a LINING BRUSH) and cutting in (with a CHISEL BRUSH).

Look after your brushes. Clean them out thoroughly with thinners after use. Keep separate brushes for CLEAR finishes and WHITE (a brush used with coloured dopes will discolour clear or white dopes, even if apparently washed out clean). And once any brush is past its best (broken tip or bristles coming out) relegate it to a secondary job, like grain filler application.





FLATTIE



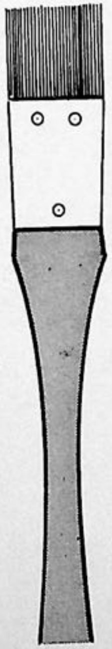
RIPMAX ARTIST BRUSHES

ARTIST PENCIL BRUSH

R-BA00	Size 00
R-BA0	Size 0
R-BA1	Size 1
R-BA2	Size 2
R-BA3	Size 3
R-BA4	Size 4
R-BA5	Size 5
R-BA6	Size 6
R-BA7	Size 7
R-BA8	Size 8
R-BA9	Size 9
R-BA10	Size 10

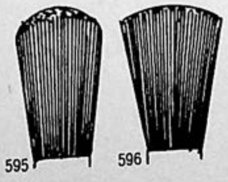
FLATTIE BRUSHES

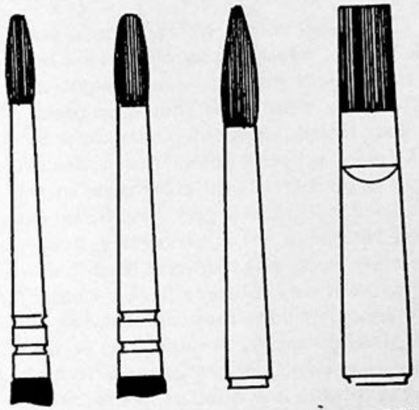
R-BF1	½"
R-BF2	¾"
R-BF3	1"
R-BF4	1¼"
R-BF5	1½"
R-BF6	1¾"



MISCELLANEOUS BRUSHES

R-595	Economy Goat Mop Brush
R-596	Small De Luxe Mop Brush
R-598	Large De Luxe Mop Brush





SPOTTER LINING PENCIL CHISEL

SIGNWRITER SPOTTER BRUSH (SABLE)

R-BSS0	Size 0
R-BSS3	Size 3

SIGNWRITER LINING BRUSH (SABLE)

R-BSL00	Size 00
R-BSL0	Size 0
R-BSL1	Size 1
R-BSL2	Size 2

SIGNWRITER PENCIL BRUSH (OX HAIR)

R-BSP0	Size 0
R-BSP1	Size 1
R-BSP2	Size 2
R-BSP3	Size 3
R-BSP4	Size 4
R-BSP5	Size 5
R-BSP6	Size 6
R-BSP8	Size 8
R-BSP10	Size 10
R-BSP12	Size 12

SIGNWRITER CHISEL BRUSH (OX HAIR)

R-BSC1	Size 1
R-BSC2	Size 2
R-BSC3	Size 3

DOPES AND FINISHES

RIPMAX

Traditional model aircraft dopes are of the cellulose type - available as clear dope and in colours. On lightweight models where weight-saving is important, only clear dope should be used. If you want a colour finish, use coloured tissue or coloured nylon. If you want a better colour finish, use a final coat of colour dope mixed with clear dope in the proportion of 1 to 5. This will add very little extra weight. Where weight is not so important, then you can start with clear dope and then add final coats of colour.

The best way to apply dopes - clear or colours - is by spray. If possible, colour dopes should always be applied by spray. A useful tip here - if the final colour is say red, or any of the bright colours, then it helps to give one coat of white first. This will help brighten the finish colour coats.

Brushing is simpler - and cheaper - so many modellers prefer to paint on dopes. Brushes used should be of the best quality you can afford, and care in cleaning and looking after them will pay dividends.

Remember that any dope finish will show up - not hide - defects in the surface or covering. Time spent in smoothing and preparing the airframe before covering is always worthwhile. High spots must be sanded down - and any small dents or nicks made good with filler. The better the finish you are aiming at, the more time should be spent in final preparation and smoothing down before covering and doping.

All cellulose dopes are attacked by glow fuel, and most are softened to some extent by diesel fuel. To protect the finish it is therefore necessary to add a final coat of fuelproofer. A fuelproofer is a clear, fuel resistant 'varnish' type coating. It is important to check that it has no effect on the type of dope used for the main finish. Some dopes are attacked and softened or blistered by certain fuel proofers. Try the combination first on a test piece just to be sure.

Some modern dopes and finishes (like polyurethane) are based on synthetic resins which are fuelproof. Aerogloss is one example. This eliminates the need for a final coat of fuelproofer, when using either clear or coloured dope. However, fuelproof dopes can often react with other types of dopes and finishes, so should not be applied over other finishes unless compatibility has been checked.

Aerogloss, for example, is a complete system - including sanding sealer, thinners, undercoat, clear and coloured dopes, all of which are fully compatible. In other words, start with Aerogloss sealer, then Aerogloss clear or undercoat as required and finally Aerogloss colour!

DO NOT Mix thinners of different types.
apply dope or cellulose over household paints, synthetics, or polyurethane.
Attempt to thin down paint or finish without appropriate thinner.
Let water come into contact with wood once doping has begun.
Spray paint of any kind without proper ventilation.

DO Leave sufficient drying time between coats.
Leave at least three to four days before flying model after fuelproofing.

AEROGLOSS FUEL PROOF CEMENTS AND FILLERS

S-AG19	Medium Tube Balsa Cement
S-AG29	Large Tube Balsa Cement
S-AG46	Large Tube Plastic Balsa

AEROGLOSS FUEL PROOF FLUORESCENT DOPES

	1 oz JAR AEROGLO
S-AG1/1	Saturn Yellow
S-AG1/2	Mercury Red
S-AG1/3	Gemini Green
S-AG1/4	Apollo Orange
S-AG1/5	Undercoat White
S-AG1/6	Thinner
	4 oz JAR AEROGLO
S-AG4/1	Saturn Yellow
S-AG4/2	Mercury Red
S-AG4/3	Gemini Green
S-AG4/4	Apollo Orange
S-AG4/5	Undercoat White
S-AG4/6	Thinner

AEROGLOSS FUEL PROOF GLOSS & FLAT DOPES

AEROGLOSS THINNERS

S-AG1/43	1 oz Jar
S-AG4/43	4 oz Jar
S-AG10/43	½ pint Tin
S-AG20/43	1 pint Tin
S-AG40/43	1 quart Tin
S-AG160/43	1 gallon Can

AEROGLOSS ALL COLOURS & SUNDRIES

S-AG1/	1 oz Jar
S-AG4/	4 oz Jar
S-AG10/	½ pint Tin
S-AG20/	1 pint Tin
S-AG40/	1 quart Tin
S-AG6/	6 oz Spray
S-AG16/	16 oz Spray
S-AG160/65	Gallon Can Clear Dope

GLOSS FUEL PROOF CEMENTS AND F

9 Medium Tube Balsa Cement
9 Large Tube Balsa Cement
6 Large Tube Plastic Balsa

LOSS FUEL PROOF FLUORESCENT DOPE

1 oz JAR AEROGLO
/1 Satum Yellow
/2 Mercury Red
3 Gemini Green
4 Apollo Orange
5 Undercoat White
6 Thinner

4 oz JAR AEROGLO
Satum Yellow
Mercury Red
Gemini Green
Apollo Orange
Undercoat White
Thinner

OSS FUEL PROOF GLOSS & FLAT DOPE

SS THINNERS
1 oz Jar
4 oz Jar
3 ½ pint Tin
3 1 pint Tin
3 1 quart Tin
43 1 gallon Can

SS ALL COLOURS & SUNDRIES
1 oz Jar
4 oz Jar
½ pint Tin
1 pint Tin
1 quart Tin
6 oz Spray
16 oz Spray
Gallon Can Clear Dope

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pactra FUEL PROOF
Aero-Gloss

THE ORIGINAL AND BY FAR THE LARGEST SELLING HOT FUEL PROOF DOPE

YOUR chance to use America's top dopes - and select from colours previously unavailable in this country. A full range of 'package' sizes to choose from, too. Quarts or pints for economy - down to 1 ounce tins for small jobs. (Fluorescents in 1 and 4 ounce sizes only. Spray cans in 6 and 16 ounce sizes).

NOTE: The list numbers opposite should be preceded by "S-AG" i.e., 4 oz Flat Black - "S-AG4/30".

Aero Gloss
HOT FUEL PROOF AIRPLANE DOPE
Aero Gloss
HOT FUEL PROOF AIRPLANE DOPE
Aero Gloss
HOT FUEL PROOF AIRPLANE DOPE

DOPES AND FINISHES

		1oz Jar	4oz Jar	½ pt Tin	1 pt Tin	1 qt Tin	6 oz Spray	16 oz Spray
30	Flat Black	-	4/30	-	-	-	-	-
31	Flat White	-	4/31	-	-	-	-	-
32	Flat Navy Blue	-	4/32	-	-	-	-	-
33	Flat Aero Blue	-	4/33	-	-	-	-	-
34	Flat Olive Drab	-	4/34	-	-	-	-	-
35	Flat Storm Gray	-	4/35	-	-	-	-	-
36	Flat Cloud Gray	-	4/36	-	-	-	-	-
37	Flat Chrome Green	-	4/37	-	-	-	-	-
38	Flat Light Earth	-	4/38	-	-	-	-	-
39	Flat Dark Earth	-	4/39	-	-	-	-	-
40	Flat Clear	-	4/40	-	-	-	-	-
43	Thinner	1/43	4/43	10/43	20/43	40/43	-	-
50	Silvaire Aluminium	1/50	4/50	10/50	20/50	-	6/50	16/50
51	Cub Yellow	1/51	4/51	10/51	20/51	40/51	6/51	16/51
52	Cub Orange	1/52	4/52	10/52	20/52	-	6/52	16/52
53	Stearman Red	1/53	4/53	10/53	20/53	40/53	6/53	16/53
54	Fokker Red	1/54	4/54	10/54	20/54	-	6/54	16/54
57	Cessna Green	1/57	4/57	-	-	-	-	-
58	Stinson Green	1/58	4/58	10/58	20/58	-	6/58	16/58
59	Cessna Gray	1/59	4/59	10/59	20/59	-	-	-
61	Curtiss Blue	1/61	4/61	10/61	20/61	-	6/61	16/61
62	Corsair Blue	1/62	4/62	10/62	20/62	-	6/62	16/62
63	Jet Black	1/63	4/63	10/63	20/63	40/63	6/63	16/63
64	Swift White	1/64	4/64	10/64	20/64	40/64	6/64	16/64
65	Clear Dope	1/65	4/65	10/65	20/65	40/65	6/65	16/65
66	Army Olive Drab	1/66	4/66	-	-	-	-	-
70	Balsa Filler Coat	1/70	4/70	10/70	20/70	-	-	-
71	Sanding Sealer	1/71	4/71	10/71	20/71	-	-	-
72	Bonanza Blue	1/72	4/72	10/72	20/72	-	-	-
73	Bendix Red	1/73	4/73	-	-	-	-	-
74	Royal Purple	1/74	4/74	10/74	20/74	-	-	-
75	Camouflage Tan	1/75	4/75	-	-	-	-	-
80	Metallic Maroon	1/80	4/80	-	-	-	-	-
81	Metallic Blue	1/81	4/81	10/81	20/81	-	6/81	16/81
82	Metallic Green	1/82	4/82	-	-	-	-	-
87	Fuel Proofer	1/87	4/87	-	-	-	6/87	16/87
88	Candy Red	-	-	-	-	-	6/88	16/88
89	Candy Orange	-	-	-	-	-	6/89	16/89
90	Candy Purple	-	-	-	-	-	6/90	16/90
91	Candy Yellow	-	-	-	-	-	6/91	16/91
92	Candy Gold	-	-	-	-	-	6/92	16/92

HUMBROL

	No. 1 Size	No. 2 Size
GLOSS		
Emerald	S-H05/ 2	S-H2/ 2
Brunswick Green	" 3	" 3
Dark Grey	" 5	" 5
Light Buff	" 7	-
Tan	" 9	" 9
Service Brown	" 10	" 10
METALLIC		
Silver	" 11	" 11
Copper	" 12	" 12
GLOSS		
French Blue	" 14	" 14
Midnight Blue	" 15	" 15
METALLIC		
Gold	" 16	" 16
GLOSS		
Orange	" 18	" 18
Bright Red	" 19	" 19
Crimson	" 20	" 20
Black	" 21	" 21
White	" 22	" 22
MATT		
Duck Egg Blue	" 23	-
Trainer Yellow	" 24	-
Blue	" 25	-
Khaki	" 26	-
Sea Grey	" 27	-
Dark Earth	" 29	-
Dark Green	" 30	-
Slate Grey	" 31	-
Black	" 33	" 33
White	" 34	" 34

HUMBROL TINLET ENAMELS

Humbrol high quality enamels are equally suitable for the modeller and the do-it-yourself enthusiast. Easily applied to practically any surface, including polystyrene, they dry quickly, leave no brush marks and give a deep, lustrous, smooth and durable finish. Resistant to petrol, oil, diesel fumes, salt and boiling water, all colours are intermixable, lead-free and non-toxic. They are the modeller's 'standard' for finishing plastic aircraft kits and similar types of models.

GLOSS	No. 1 Size	No. 2 Size
Clear Polyurethane	S-H05/35	S-H2/35
Lime	" 38	" 38
Pale Grey	" 40	" 40
Ivory	" 41	" 41
Sea Blue	" 47	" 47
Mediterranean Blue	" 48	" 48
MATT		
Clear Varnish	" 49	-
METALLIC		
Mist Green	" 50	-
Sunset Red	" 51	-
Baltic Blue	" 52	-
Gunmetal	" 53	-
Brass	" 54	-
Fire Bronze	" 55	-
MATT		
Scarlet	" 60	-
Flesh	" 61	-
Leather	" 62	-
Sand	" 63	-
Light Grey	" 64	-
Aircraft Blue	" 65	-
Olive Drab	" 66	-
Tank Grey	" 67	-
GLOSS		
Purple	" 68	" 68
Yellow	" 69	" 69
MATT		
Brick Red	" 70	-

HUMBROL DOPES

HUMBROL DOPES are of the alkaline nitrate type, specially formulated for maximum coverage, rapid drying and flexibility. They are available in a range of nine colours, and also clear. Colour dopes are available in three sizes. Clear dope and sanding sealer is available in five sizes.

HUMBROL COLOUR DOPES

	No. 2 Size	No. 4 Size	¼ Litre
Green	S-H102/2	S-H105/2	S-H110/2
Grey	" 5	" 5	" 5
Yellow	" 8	" 8	" 8
Silver	" 11	" 11	" 11
Blue	" 14	" 14	" 14
Orange	" 18	" 18	" 18
Red	" 19	" 19	" 19
Black	" 21	" 21	" 21
White	" 22	" 22	" 22

HUMBROL CLEAR DOPE & SANDING SEALER

	Clear Dope	Sanding Sealer
No. 2 Size Tin	S-H102/35	S-H102/35S
No. 4 Size "	S-H105/35	S-H105/35S
¼ Litre "	S-H110/35	S-H110/35S
2½ Litre "	S-H180/35	S-H180/35S
5 Litre "	S-H199/35	S-H199/35S

HUMBROL THINNERS,

S-H201	Small Bo
S-H202	Medium T
S-H203	Large T
S-H211	Small Bo
S-H212	Medium
S-H221	No. 2 Si
S-H222	No. 4 Si
S-H223	Small S
S-H231	No. 2 S
S-H232	No. 4 S
S-H233	Small S
S-H326	Small E

HUMBROL ADHESIV

S-H44M	Medium
S-H44MO	Monste
S-H66M	Mediun
S-H66L	Large
S-H66MO	Monste
S-H70	Bottle
S-H77M	Mediur
S-H77L	Large T

RIPMAX

IBROL DOPES

ROL DOPES are of the alkaline nitrate type,
lly formulated for maximum coverage, rapid
and flexibility. They are available in a range
e colours, and also clear. Colour dopes are
ble in three sizes. Clear dope and sanding
is available in five sizes.

BROL COLOUR DOPES

	No.2 Size S-H102/2	No.4 Size S-H105/2	½ Litre S-H110/2
	" 5	" 5	"
w	" 8	" 8	"
r	" 11	" 11	"
	" 14	" 14	"
ge	" 18	" 18	"
	" 19	" 19	"
k	" 21	" 21	"
e	" 22	" 22	"

BROL CLEAR DOPE & SANDING SEALER

	Clear Dope	Sanding Sealer
2 Size Tin	S-H102/35	S-H102/35S
4 Size "	S-H105/35	S-H105/35S
re "	S-H110/35	S-H110/35S
itre "	S-H180/35	S-H180/35S
re "	S-H199/35	S-H199/35S

HUMBROL THINNERS, FUEL PROOFERS & SUNDRIES

S-H201	Small Bottle Cellulose Thinners
S-H202	Medium Tin " "
S-H203	Large Tin " "
S-H211	Small Bottle Enamel Thinners
S-H212	Medium Tin " "
S-H221	No. 2 Size Tin Gloss Fuel Proofer
S-H222	No. 4 Size Tin " " "
S-H223	Small Spray " " "
S-H231	No. 2 Size Tin Matt Fuel Proofer
S-H232	No. 4 Size Tin " " "
S-H233	Small Spray " " "
S-H326	Small Bottle Universal Cleaner

HUMBROL ADHESIVES

S-H44M	Medium Tube Tissue Paste 44
S-H44MO	Monster Tube " " "
S-H66M	Medium Tube Balsa Cement 66
S-H66L	Large Tube " " "
S-H66MO	Monster Tube " " "
S-H70	Bottle Liquid Polystyrene Cement 70
S-H77M	Medium Tube Polystyrene Cement 77
S-H77L	Large Tube " " "

FUEL PROOFING

Most conventional dopes and finishes are attacked by glow fuels, which have a solvent action on them. Also, as a general rule, the 'hotter' the glow fuel (i.e. the higher the nitro-methane or fuel dope content), the more rapid and more pronounced this attack will be.

It is thus essential to protect such finishes with a final overall coat of FUEL PROOFER which is really a specially formulated clear finish resistant to attack by glow fuels. Such a coating thinly, but uniformly, applied will not add a great deal of extra weight - and there is usually the bonus of an improved gloss finish.

Diesel fuels are less likely to attack conventional finishes but on a diesel-powered model a final finish coating of fuelproofer is also recommended.

Pactra AEROGLOSS dopes do not require a final coat of fuelproofer. They are specially formulated to be resistant to all fuels.

TUFKOTE Twin Pack Proofer
cat no S-TK1

A PROVEN finish that resists all fuels - dries to a crystal-clear high gloss (and stays that way!) Touch-dry in 5 minutes. Hard in 2 hours. For brush or spray application - and can be used over any finish. Economical - with good covering power. The finish that will outlast your model!

FIBREGLASS TIPS...

Basic materials for working in Glass Reinforced Plastics - or 'fibreglass' as it is popularly called - are resin and catalyst, glass mat, cloth and tape, and various fillers. All these are to be found in the Bondaglass range of products listed on page 141.

BONDAGLASS RESIN is a general purpose type, supplied complete with catalyst, and suitable for all types of glass fibre work - making mouldings, covering with glass fibre, repair work, etc, as well as for gel coats.

For making fibreglass mouldings, either GLASS MAT or GLASS CLOTH is used. Choice is largely a matter of convenience. Mat drapes more readily than cloth, but the latter is easier to handle and stronger. GLASS TAPE makes neater overlay reinforcement - such as over the centre point on foam wing panels. TISSUE can be used to give a smooth surface when laying up mouldings.

BONDAPASTE is a carefully prepared plastic filler - ideal for making good any dents and similar repair work. It requires only the addition of hardener and sets in 20 to 30 minutes.

BONDAPRIMER is a resin based primer for use on metals, giving rust resistance and improving adhesion between metals and Bondaglass resin. It also works well on ABS plastic which is to be painted over.

BONFIL FILLER is a rapid curing paste filler with glass fibre reinforcement for 'strong' repairs, etc. It is non-absorbent.

BONDAFOAM is an 'instant' polyurethane foam kit for in-situ foaming - e.g. filling buoyancy compartments in boat hulls.

Finally, Bondaglass ALUMINIUM MESH is another type of strong reinforcement, or base material for making moulds and forms - or realistic grilles.

ADHESIVES

CHOOSING ADHESIVES

Balsa cement is still the most widely used adhesive for gluing balsawood - although many modellers prefer PVA (white glue). PVA is particularly useful where joints need to be 'shuffled' or where large areas of sheeting are to be glued down at one time. The main disadvantage of PVA is that it takes a long time to set. Joints need leaving pinned down in place for up to 24 hours. Also PVA is not waterproof. It should never be used on model boat hulls.

EPOXY is the modern 'strong' glue that sticks almost anything. It is one of the more expensive adhesives, but a little goes a long way. Ideal for strong joints - e.g. hardwood bearers to ply or balsa, ply to balsa, or even balsa to balsa. Also epoxy will stick metal to balsa or wood - or metal to metal. Just make sure that the joint faces are clean and grease free. Useful also for general domestic repair work, etc. In fact, epoxy can be used for just about every gluing job, including jointing glazed surfaces and other hitherto 'unglueable' jobs.

IMPACT adhesives are also useful for gluing most surfaces - with the advantage that the joint is 'strong' as soon as the joint is completed. The joint continues to harden and strengthen, but always retains a certain flexibility. Useful for quick assembly of balsa blocks, etc. which take so long for joints to harden enough for carving with most other adhesives.

For hardwoods - and gluing large balsa blocks, etc. - choose a RESIN WOOD GLUE. Best for gluing ply skins on boat hulls too. Drying time is up to 20 hours, but the joint is strong, permanent, and fully waterproof.

"DEVCON ADHESIVES"

A specialist range of adhesives with superior performance. DEVCON EPOXY has virtually revolutionised the application of this type of adhesive - setting in 5 minutes or so, instead of the usual 12-24 hours, (a 60-minute setting EPOXY is also available). You can actually complete joints faster with 5-MINUTE EPOXY than with balsa cement. The resulting joint is stronger too - and fully fuel and oil-proof. Another advantage with epoxy! Modellers have also found it ideal for field repairs.

The DEVCON range also includes an instant adhesive fast-curing filler and paste - and silicon rubber sealant (excellent for 'caulking' and similar work requiring waterproof joints).

S-DV10	Zip-Grip 10 Instant Grip
S-DV30	30-min Ally Filled Epoxy
S-DV1	30-min. General Purpose Paste
S-DV40	10-min Fast Cure Paste
	CLEAR EPOXY
S-DV20	60-min
S-DV205	5-min (Standard)
S-DV206	5-min (Economy)
S-DV207	5-min (Industrial)
S-DV100	Seal-It Silicone Rubber

EVODE ADHESIVES

EVOSTIK IMPACT ADHESIVE		
S-EV701	Small	Tube
S-EV702	Large	Tube
S-EV703	½ pint	Tin
S-EV704	1 pint	Tin
EVOSTIK RESIN W GLUE (PVA)		
S-EV721	Mini	Pinch-Pac
S-EV722	4 oz	Pinch-Pac
S-EV723	1 pint	Pinch-Pac
EVOSTIK CLEAR ADHESIVE		
S-EV730	Tube	

MISCELLANEOUS ADHESIVES

S-A681	Araldite 24 hr Epoxy
S-A682	" Rapid 10-min Epoxy
S-BN684	Small Tin Cascamite Wood Glue
S-BN685	Medium " " " "
S-BN688	Large " " " "
S-BN691	Superfast 5-min Epoxy (standard)
S-BN692	" " " (large)
S-HA11	Stabilit Express 20-min Epoxy (30gm)
S-HA12	" " " " (85gm)

Bondaglass products a
Specially formulated re
- plus primers and fil
for GRP work - and a
Aluminium mesh is a
general modelling work
well as a reinforcem

BONDAGLASS PRODU

T-BG1	Minipac Repa	
T-BG2	Glassfibre Re	
	RESIN WITH	
T-BG11	5 oz	
T-BG12	250 gram	
T-BG13	500 gram	
T-BG14	1 Kg	
	CATALYST	
T-BG18	½ oz	
T-BG19	1 oz	
T-BG20	2 oz	
	GLASS FIB	
T-BG21	Mat	36
T-BG22	Cloth	36
T-BG23	Tissue	36
T-BG27	Tape	2
T-BG28	Tape	6
T-BG31	Aluminium	
T-BG48	½lb Bondap	
T-BG53	¼pt Bondap	
T-BG54	250 ml Bor	
T-BG64	12 oz Bonf	
T-BG70	Bondafoam	

ODE ADHESIVES

VOSTIK IMPACT ADHESIVE	
EV701	Small Tube
-EV702	Large Tube
-EV703	½ pint Tin
-EV704	1 pint Tin
VOSTIK RESIN W GLUE (PVA)	
-EV721	Mini Pinch-Pac
-EV722	4 oz Pinch-Pac
-EV723	1 pint Pinch-Pac
VOSTIK CLEAR ADHESIVE	
-EV730	Tube

MISCELLANEOUS ADHESIVES

S-A681	Araldite 24 hr Epoxy
S-A682	" Rapid 10-min Epoxy
S-BN684	Small Tin Cascamite Wood Gl
S-BN685	Medium " "
S-BN688	Large " "
S-BN691	Superfast 5-min Epoxy (standa
S-BN692	" " (large
S-HA11	Stabilit Express 20-min Epoxy (3
	" "

MATERIALS

Bondaglass products are of the finest quality. Specially formulated resin and matching catalyst - plus primers and fillers. Everything you need for GRP work - and all items fully compatible. Aluminium mesh is a unique item - useful for general modelling work (e.g. grilles, etc.), as well as a reinforcement material.

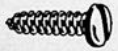
BONDAGLASS PRODUCTS

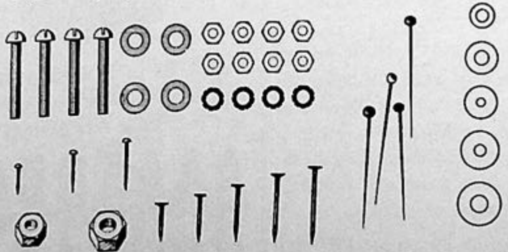
T-BG1	Minipac Repair Kit	
T-BG2	Glassfibre Repair Kit	
	RESIN WITH CATALYST	
T-BG11	5 oz	
T-BG12	250 gram	
T-BG13	500 gram	
T-BG14	1 Kg	
	CATALYST ONLY	
T-BG18	½ oz	
T-BG19	1 oz	
T-BG20	2 oz	
	GLASS FIBRE	
T-BG21	Mat	36" x 24"
T-BG22	Cloth	36" x 24"
T-BG23	Tissue	36" x 36"
T-BG27	Tape	2" x 72"
T-BG28	Tape	6" x 36"
T-BG31	Aluminium Mesh 10" x 8"	
T-BG48	½lb Bondapaste	
T-BG53	¼pt Bondaprimer	
T-BG54	250 ml Bondaprimer	
T-BG64	12 oz Bonfil Filler	
T-BG70	Bondafoam HR	

RipMax HOBBYPAKS

RIPMAX HOBBYPAKS are the handiest - and easiest - way of buying those so-necessary small 'hardware' items - nuts, bolts and washers, modelling pins, etc. etc. You will find HOBBYPAKS on display at your local model shop, look for the card numbers shown below to find the item(s) you want. All packets are the same price (except blind nuts) and number of pieces vary accordingly. (For example, you obviously get more panel pins than bolts and nuts for the same price!)

Steel Nuts, Bolts & Washers 10BA - T-2000
6BA - T-2001 8BA - T-2002 4BA - T-2000A
Brass Nuts, Bolts & Washers
4BA, 6BA or 8BA - T-2003
Brass Panel Pins 1/8", ¼" or ½" - T-2005
Big Headed Pins - T-2004
(also available in boxes of 130 - T-2004B)
Superspeed Cored Solder - T-2006
Vibration Proof Nuts, Bolts & Washers
4BA, 6BA or 8BA - T-2007
Assorted Washers - 4BA, 6BA or 8BA - T-2008
Steel Full Nuts - 4BA, 6BA or 8BA - T-2009
Blind Nuts, Bolts & Washers
4BA, 6BA or 8BA - T-2011
Self Tapping Screws
Sizes A, B, C or D - T-2012



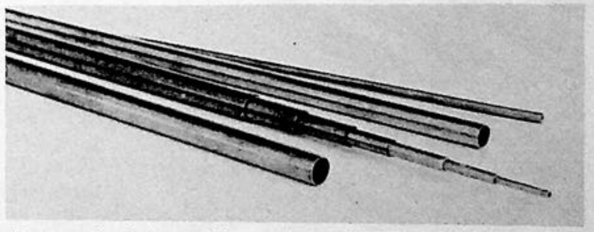


12" TEMPERED BRASS TUBING

T-BT8	8 SWG bore
T-BT10	10 SWG "
T-BT12	12 SWG "
T-BT14	14 SWG "
T-BT16	16 SWG "
T-BT18	18 SWG "
T-BT20	20 SWG "
T-BT332	3/32" "

12" TEMPERED ALUMINIUM TUBING

T-AT8	8 SWG bore
T-AT10	10 SWG "
T-AT12	12 SWG "
T-AT14	14 SWG "
T-AT16	16 SWG "
T-AT18	18 SWG "
T-AT20	20 SWG "



Full-soft high quality seamless copper tubing, easy to manipulate into bends. Each size is a smooth telescopic fit in the next size up.

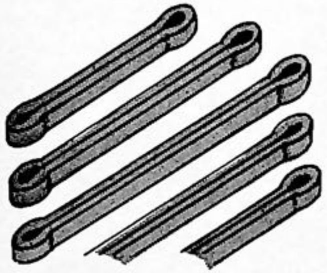
18" SOFT COPPER TUBING

T-CT1	1/8" O.D. (5/64" bore)
T-CT2	3/16" O.D. (1/8" ")
T-CT3	1/4" O.D. (3/16" ")
T-CT4	5/16" O.D. (1/4" ")
T-CT5	3/8" O.D. (5/16" ")
T-CT6	7/16" O.D. (3/8" ")
T-CT7	1/2" O.D. (7/16" ")

MATERIALS

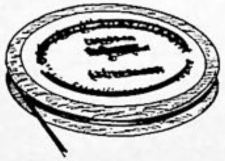
RIPMAX RUBBER BANDS are something special. Made from a specially compounded rubber which is both oil-proof and age-resistant. (Many other rubber bands, for example, tend to become brittle when exposed to sunlight). Tough - and elastic.

To select a right length of rubber band for wing fixings, allow for a '3 times' stretch. For example, if the distance between retaining dowels is 12", choose 12/3 = 4" bands; or an 8" band to double back to the first dowel.



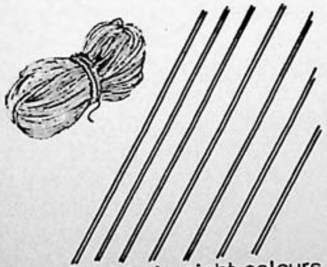
RUBBER BANDS

T-RBA	Pym Assorted 1/16" (pkt)
	SUPALASTIC BANDS (per dozen)
T-RB25	2½"x 1/8"
T-RB35	3½"x 1/4"
T-RB40	4" x 3/8"
T-RB50	5" x 3/8"
T-RB55	5½"x 1/2"
T-RB65	6½"x 1/2"
T-RB70	7" x 5/8"
T-RB80	8" x 5/8"



LAYSTRATE STRANDED WIRE

	LIGHTWEIGHT LAYSTRATE
T-LL70	70 feet
T-LL100	100 feet
	HEAVYWEIGHT LAYSTRATE
T-HL70	70 feet
T-HL100	100 feet

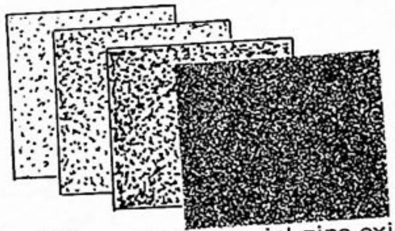


Available in eight colours

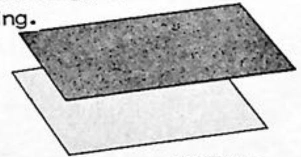
IRISH LINEN THREAD (in Hanks)

T-LT1	White
T-LT2	Yellow
T-LT3	Green
T-LT4	Blue
T-LT5	Orange
T-LT6	Red
T-LT7	Brown
T-LT8	Black

HIGH TENSILE synthetic thread, white only, in 6 sizes.



LUBRISIL - with the special zinc oxide powder lubricant incorporated. Cuts longer without clogging - for smoother, faster sanding.



PLASTIC LETTERS available in a range of different colours. Each set includes alphabet and numbers.

GRAUPNER RIGGING CORD

T-G421	0.5mm
T-G422	0.7mm
T-G423	1.0mm
T-G424	1.5mm
T-G425	2.0mm
T-G441	0.3mm

GARNET PAPER 11" x 9"

T-GP320	Extra Fine
T-GP220	Fine
T-GP120	Medium
T-GP80	Coarse
T-GP50	Extra Coarse

LUBRISIL PAPER 11" x 9"

T-LP320	Extra Fine
T-LP240	Fine
T-LP150	Medium
T-LP80	Coarse

BETTO MASKING TAPE

(Rolls of 59 ft)

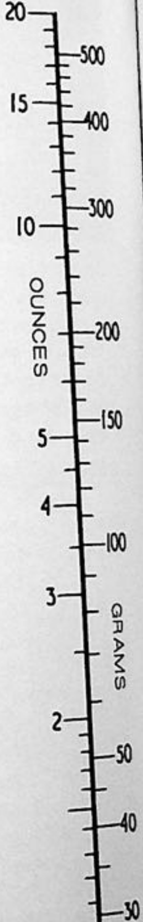
T-MT1	1/2"
T-MT2	3/4"
T-MT3	1"

HUMBROL MATERIALS

T-H921	5 oz tin Lubricating Oil
T-H922	Squeeze Tube Precision Oil

RIPMAX PLASTIC LETTERING

T-RA81	8mm	(79 pieces)
T-RA83	12mm	(79 ")



ad,

GRAUPNER RIGGING CORD

T-G421	0.5mm
T-G422	0.7mm
T-G423	1.0mm
T-G424	1.5mm
T-G425	2.0mm
T-G441	0.3mm

GARNET PAPER 11" x 9"

T-GP320	Extra Fine
T-GP220	Fine
T-GP120	Medium
T-GP80	Coarse
T-GP50	Extra Coarse

inc oxide
l. Cuts
moother,

LUBRISIL PAPER 11" x 9"

T-LP320	Extra Fine
T-LP240	Fine
T-LP150	Medium
T-LP80	Coarse

BETTO MASKING TAPE

(Rolls of 59 ft)

T-MT1	1/2"
T-MT2	3/4"
T-MT3	1"

HUMBROL MATERIALS

T-H921	5oz tin Lubricating
T-H922	Squeeze Tube Pre

e in a
Each
umbers.

RIPMAX PLASTIC LETTERING

T-RA81	8mm (79 pieces)
T-RA83	12mm (79

RIPMAX NYLON

COVERING

by MIKE BIRCH

Finishing really starts at the completion of the air frame itself, careful attention at this stage can save a lot of problems at a later date. Let's start with an open framework model first.

The whole airframe must be sanded all over to make sure there are no protrusions such as rib or stringer ends to puncture the tissue. A small block of wood about 3" long by 2" wide with the abrasive paper pinned or stuck on may be used, an off-cut of balsa will suffice. After sanding all over the wood should be given one or two coats of sanding sealer. The object of this is to fill in the grain and put on the wood a surface that when sanded is smooth and a good base for applying the covering. It is, of course, only necessary to seal those faces we want the covering to touch. After sealing, sand the surface again with about 320 or 360 grit wet or dry, used dry.

We have the choice of covering, ranging from tissue, silk and nylon. Tissue comes in heavy or light weights, the lightest being used on only the really lightest of structures, such as glider tailplanes and competition type rubber powered models. We will consider tissue covering first.

Support the leading and trailing edge on balsa blocks on the flat board. Cut the tissue to a size that is about 1" larger all round than the area to be covered. If the tissue is looked at under a light then it will be seen that there is a top and bottom side, the top having the slightly more shiny surface. This should be on the outside of the structure. Lay the tissue over the surface and pull out the large wrinkles. Use pins here and there to get the tissue as flat as possible. Lightly brush a small amount of clear dope along the edges of the tissue, the dope will go through the covering and stick the tissue to the woodwork. Small wrinkles will appear where the brush has gone, but if allowed to dry they will disappear.

When the dope has dried, remove pins and trim the excess tissue. Stick the edges down with a little more dope. Then carry on and cover the rest of the bottom of the wing in the usual way. The tail is covered in exactly the same way as the wing, but using lightweight tissue.

When the bottom of the wing and tail are covered, carefully pin them down to the board and apply one coat of clear shrinking dope to the tissue. The first coat of dope is thinned out 50/50 with dope thinners. This will avoid the tissue pulling the structure too much. Allow the dope to dry. Next, turn the wing and tail over and pin down again. Cover the top side of them in the same way as the underside. Remove the wing from the board and stick down any loose ends and edges with dope. When dry, lightly sand the wing with about 600-700 wet or dry removing any small bumps. It should only be necessary to apply one more coat of dope and the wing and tail are finished.

The fuselage is covered in a very similar way, covering the two sides and just trimming any excess tissue before covering the top and bottom. The fuselage can be given 3 coats of dope to stiffen it and give a certain amount of water-proofing.

The method used here will be applicable to most lightweight models, but if the model is, for example, a control line or radio control model, where a composite structure with sheeted and open areas have been used, either silk or lightweight nylon could be used. The weight difference between them can be very small, but the materials differing in their strength to a fair degree, nylon covering standing a lot more punishment. As I've said, the difference in covering with silk or nylon is small. The airframe must be sanded and prepared with sanding sealer in the same way as before. If the nylon is then laid over the structure, all the wrinkles can be pulled out, pinning the material at the leading and trailing edges. The nylon can be applied slightly damp and on drying this will tend to shrink the material so removing all wrinkles. Stick down the edges with thick dope, rubbing with the finger to make sure it has penetrated. When dry, remove pins and trim the edges with a razor blade. The nylon (or silk) will 'give' more than tissue, so will take more pulling until all the wrinkles have disappeared.

The fuselage can be divided into about 4-6 areas for covering. Pin the nylon over the area to be covered and apply clear dope, rubbing any wrinkles out with the brush. It is important to use only sharp razor blades as the nylon, if not cut properly, will tend to string and become untidy. Finally, when the dope is dry, cover the next area and treat it in the same way. Nylon will go round compound curves quite easily, with gentle pulling.

NYLON CLOTH - 36" WIDE

WHITE NYLON:

ECONOMY	1 yd pack	T-NC1
	3 yd pack	T-NC2
SUPALITE	1 yd pack	T-NC11
	3 yd pack	T-NC12
TENSILE	1 yd pack	T-NC21
	3 yd pack	T-NC22

COLOURED TENSILE NYLON

YELLOW	1 yd pack	T-NC31
	3 yd pack	T-NC32
ORANGE	1 yd pack	T-NC41
	3 yd pack	T-NC42
RED	1 yd pack	T-NC51
	3 yd pack	T-NC52
BLUE	1 yd pack	T-NC61
	3 yd pack	T-NC62
KHAKI	1 yd pack	T-NC71
	3 yd pack	T-NC72
FLUORESCENT ORANGE	1 yd pack	T-NC81
	3 yd pack	T-NC82

Nylon covering should be given 2 or 3 coats of shrinking type clear dope - either used full strength or 3 : 1 dope : thinners. Ensure good penetration of dope by brushing in well. Open areas should be doped upside down. Light smoothing between coats (when dry) can be done with 600 grit wet or dry abrasive, (used dry).

COVERING WITH FILM

APPLICATION of a piece of Solarfilm can be divided into three simple steps:

1. TACK IN PLACE
2. SHRINK TO SHAPE
3. SMOOTH INTO CONTACT

e.g. to cover a WING PANEL. Cover the bottom surface first with one piece - then cover the top surface with a separate piece. Wrapping one piece of Solarfilm round the section to be covered is NOT recommended. Lay out the Solarfilm sheet, plastic liner side up and lay the wing panel on it. Mark the outline with a grease pencil, then cut the film panel approximately 1" larger chordwise, and 3" larger at the wing tip. Peel off the plastic liner and smooth the panel into place with your fingers. Now TACK down the edges of the film with the toe of the iron. Use a wiping action with very light pressure - pulling the film gently to smooth out wrinkles. Do NOT pull 'drum tight'.

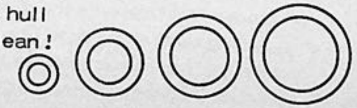
Next - seal around the edges using the sole of your iron. Pull the Solarfilm gently round the edge and roll the iron round the edge.

You are now ready to SHRINK the Solarfilm. Start in the centre of the panel and work towards the edges. Use the flat of your iron very close but NOT TOUCHING the film. Glide the iron slowly across the surface - small wrinkles will appear around the iron but will disappear as the iron covers them. DO NOT TRY TO REMOVE WRINKLES BY PRESSING DOWN WITH THE IRON - JUST ALLOW THE HEAT OF THE IRON TO SHRINK THE FILM. FUSELAGE SIDES, TOPS & BOTTOMS, TAIL SURFACES, etc. are covered in a similar way to a wing panel, i.e. TACK, SHRINK, SMOOTH. Allow overlaps of 1/8" to 1/4". Seal seams and edges inside the engine compartment with epoxy.

COMPOUND CURVES such as wing tips, cowlings, etc - always shrink the film to shape BEFORE smoothing down on the balsa, e.g. WING TIP. Cut a piece of Solarfilm 2" over-size all round. Tack along a narrow line around the extreme end of the tip. Then starting at the leading edge pull the film gently over toward the top surface of the wing until wrinkles form. Shrink out the wrinkles with heat from the edge of the iron - pulling gently on the film so that it does not touch the balsa. Work repeatedly from leading edge to centre and from trailing edge to centre - each time shrinking a narrow strip of Solarfilm to shape before smoothing into contact with the balsa.

"HIGH TEMPERATURE SILICONE RUBBER TUBING"

Extra flexible - and HEAT RESISTANT. The smaller bore sizes (available in 36" lengths) are ideal for fuel tubing. Does not age-harden. The larger diameters (available in 12" lengths) are ideal for boat installations, for 'piping' connection to engine silencers - taking the exhaust outlet through the hull side or transom. Keeps the hull interior clean! Simpler to use than metal tubing.



36" length / bore size	1/16"	T-ST88
	3/32"	T-ST89
	1/8"	T-ST90
12" length / bore size	1/4"	T-ST92
	3/8"	T-ST94
	1/2"	T-ST95
	5/8"	T-ST96
	3/4"	T-ST97
	1"	T-ST98

Solarfilm
ENGLAND

T-F1/1-29	26"x36" sheet	T-F1/30-33	26"x36" sheet
T-F2/1-29	26"x50" sheet	T-F2/30-33	26"x50" sheet
T-F3/1-29	26"x10 yd roll	T-F3/30-33	26"x10 yd roll

COLOURS	26" x 36"	26" x 50"	26" x 10yd
TRANSPARENT			
Blue	T-F1/1	T-F2/1	T-F3/1
Yellow	T-F1/2	T-F2/2	T-F3/2
Orange	T-F1/3	T-F2/3	T-F3/3
Red	T-F1/4	T-F2/4	T-F3/4
OPAQUE			
White	T-F1/10	T-F2/10	T-F3/10
Black	T-F1/11	T-F2/11	T-F3/11
Midnight Blue	T-F1/12	T-F2/12	T-F3/12
Tropic Blue	T-F1/13	T-F2/13	T-F3/13
Yellow	T-F1/14	T-F2/14	T-F3/14
Orange	T-F1/15	T-F2/15	T-F3/15
Red	T-F1/16	T-F2/16	T-F3/16
Dark Red	T-F1/17	T-F2/17	T-F3/17
Silver	T-F1/29	T-F2/29	T-F3/29
Gold	T-F1/30	T-F2/30	T-F3/30
Metallic Blue	T-F1/31	T-F2/31	T-F3/31
" Green	T-F1/32	T-F2/32	T-F3/32
" Red	T-F1/33	T-F2/33	T-F3/33

T-F10 1 oz Bottle Solarfilm Solvent

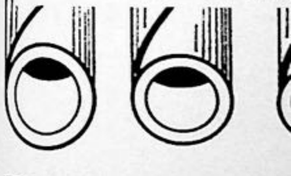
USE THE CORRECT IRON TEMPERATURE! Set the iron to 'Low' or 'Rayon' and allow about 10 minutes to heat up. Test the temperature by dropping a scrap of film on to the sole of the iron. At the correct temperature the Solarfilm will begin to curl slowly - if it shrivels quickly the iron is too hot and the setting must be lowered. Recheck on a fresh scrap of Solarfilm.

TISSUE
CO

By far the cheape
aircraft - and especial
mum overall weight is
tissue is specially we
available in two weigh
water-spraying and / c
strength to built-up air
flexible covering mat
overall covering for s
improves strength and
surfaces.

REDLIN
FLEXIB

Tubing that stays flex
the red stripe running



De luxe RUB

Special AERO QUALIT
Recommended for mot
Also square section ru
and longest life - rub
lubricated with a propr
NEVER use ordinary o
This table can be used
"run-in"! Multiply t

STRIP SIZE 2
1/8 70
3/16 66
1/4 60

RIPMAX

TISSUE, RUBBER PVC TUBING, PIANO WIRE

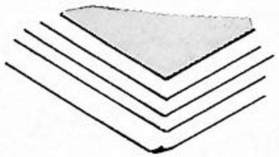
TISSUE COVERING

By far the cheapest covering material for aircraft - and especially suitable where minimum overall weight is the aim. MODELSPAN tissue is specially wet-strengthened and is available in two weights. Tautens well with water-spraying and/or clear doping. Adds strength to built-up airplanes (far more so than flexible covering materials). Also simple overall covering for solid structures which improves strength and finish of sheet balsa surfaces.

MODELSPAN TISSUE

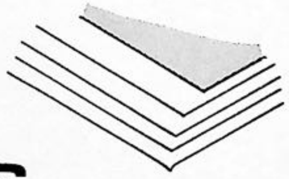
LIGHTWEIGHT MODELSPAN

T-M1	White
T-M2	Yellow
T-M3	Orange
T-M4	Red
T-M5	Blue
T-M6	Black



HEAVYWEIGHT MODELSPAN

T-M11	White
T-M12	Yellow
T-M13	Orange
T-M14	Red
T-M15	Blue
T-M16	Black



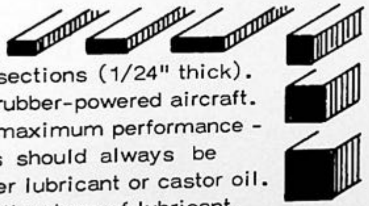
REDLINE FLEXIBLE PVC TUBING

Tubing that stays flexible - and bends into curves readily without kinking. Easily identified by the red stripe running through it. Available in the six most useful bore sizes, sold by the foot.

REDLINE SUPATUBE

T-PT88	1/16" bore	T-PT89	3/32" bore
T-PT90	1/8" "	T-PT91	3/16" "
T-PT92	1/4" "	T-PT93	5/16" "

De luxe RUBBER



Special AERO QUALITY in strip sections (1/24" thick). Recommended for motors for all rubber-powered aircraft. Also square section rubber. For maximum performance - and longest life - rubber motors should always be lubricated with a proprietary rubber lubricant or castor oil. NEVER use ordinary oils or any other type of lubricant.

T-DR1	1/8" Flat Rubber
T-DR2	3/16" " "
T-DR3	1/4" " "
T-DR11	1/8" Square Rubber
T-DR12	3/16" " "
T-DR13	1/4" " "

(Sold by the foot)

This table can be used to calculate maximum safe turns on a lubricated rubber motor after it has been "run-in"! Multiply table figure (TURNS PER INCH) by actual length of motor:-

	NUMBER OF STRANDS IN MOTOR											
STRIP SIZE	2	4	6	8	10	12	14	16	18	20	22	24
1/8	70	55	45	40	35	32	30	29	27	26	25	23
3/16	66	49	41	35	31	29	27	26	24	23	21	-
1/4	60	46	36	30	26	23	22	20	18	-	-	-

PIANO WIRE

36" TINNED PIANO WIRE

T-TP8	8 SWG	T-TP10	10 SWG
T-TP12	12 SWG	T-TP14	14 SWG
T-TP16	16 SWG	T-TP18	18 SWG
T-TP20	20 SWG	T-TP22	22 SWG
T-TP24	24 SWG		

Wire sizes in Britain are normally specified by Standard Wire Gauge (SWG) number. In America the Brown and Sharpe wire gauge is most commonly used - but the diameter sizes for the same numbers differ from SWG. Metric wire sizes are specified in millimetres. The following table will be useful in working out equivalents.

SWG No.	dia. inches	nearest fraction	nearest American equiv.	ISO Metric equiv.
6	.192	-	5	4.75
8	.160	5/32	6	4.0
10	.128	1/8	8	3.15
12	.104	7/64	10	2.65
14	.080	5/64	12	2.0
16	.064	1/16	14	1.6
18	.048	3/64	16	1.18
20	.036	1/32	19	0.9
22	.028	-	21	0.71
24	.022	-	23	0.56
26	.018	-	25	0.45
28	.0148	1/64	27	0.375
30	.0124	-	28	0.315
32	.0108	-	29	0.280
34	.0092	-	31	0.236
36	.0076	-	32	0.190

SOLARBO BALSA

BALSA STRIP is cut in the following standard sizes only. Standard length for all sizes is 36". Strip is normally cut from heavier grades of balsa, the smaller the section the heavier the density (as a general rule). However, there will be density variations in the same strip sizes. Always use matched lengths of strip for longerons, and wing spars (i.e. equal weight lengths).

NOMINAL METRIC EQUIVALENTS

inch	mm
1/64 ...	0.4
1/32 ...	0.8
1/16 ...	1.5
3/32 ...	2.5
1/8 ...	3.0
3/16 ...	5.0
1/4 ...	6.0
5/16 ...	7.5
3/8 ...	10.0
1/2 ...	12.5
5/8 ...	15.0
3/4 ...	20.0
7/8 ...	22.5
1	25.0
1¼	30.0
1½	40.0
1¾	45.0
2	50.0
2¼	56.0
2½	62.0
2¾	68.0
3	75.0
3¼	82.0
3½	87.0
3¾	94.0
4	100.0

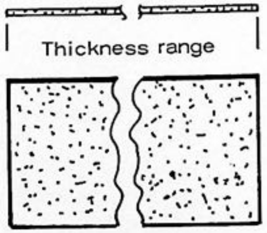
SPECIAL BALSA PACK

U-L740	Balsa Bundle

36" BALSA STRIP

U-L220	1/16"	x 1/16"
U-L221		x 1/8"
U-L222		x 3/16"
U-L223		x 1/4"
U-L230	3/32"	x 3/32"
U-L240	1/8"	x 1/8"
U-L241		x 3/16"
U-L242		x 1/4"
U-L243		x 3/8"
U-L244		x 1/2"
U-L250	3/16"	x 3/16"
U-L251		x 1/4"
U-L253		x 1/2"
U-L260	1/4"	x 1/4"
U-L262		x 1/2"
U-L263		x 1"
U-L270	3/8"	x 3/8"
U-L280	1/2"	x 1/2"
U-L283		x 1"

BALSA SHEET is normally cut in 2" or 3" widths and 36" length as standard. There is a more restricted supply of 4" and 5" widths; and also 48" in 4" and 5". The cut of sheet affects its stiffness. For rigidity (e.g. wing ribs) use quarter grain sheet (recognisable by its speckled grain appearance). For sheet covering curved surfaces, select sheet which bends easily edge - to - edge.



48" BALSA SHEET

U-L40X	4"	x 1/32"
U-L41X		x 1/16"
U-L42X		x 3/32"
U-L43X		x 1/8"
U-L44X		x 3/16"
U-L45X		x 1/4"
U-L46X		x 3/8"
U-L47X		x 1/2"
U-L50X	5"	x 1/32"
U-L51X		x 1/16"
U-L52X		x 3/32"
U-L53X		x 1/8"
U-L54X		x 3/16"
U-L55X		x 1/4"
U-L56X		x 3/8"
U-L57X		x 1/2"

36" BALSA SHEET

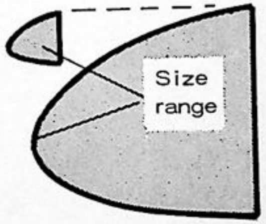
U-L20	2"	x 1/32"
U-L21		x 1/16"
U-L22		x 3/32"
U-L23		x 1/8"
U-L24		x 3/16"
U-L25		x 1/4"
U-L26		x 3/8"
U-L27		x 1/2"
U-L30	3"	x 1/32"
U-L31		x 1/16"
U-L32		x 3/32"
U-L33		x 1/8"
U-L34		x 3/16"
U-L35		x 1/4"
U-L36		x 3/8"
U-L37		x 1/2"
U-L40	4"	x 1/32"
U-L41		x 1/16"
U-L42		x 3/32"
U-L43		x 1/8"
U-L44		x 3/16"
U-L45		x 1/4"
U-L46		x 3/8"
U-L47		x 1/2"
U-L50	5"	x 1/32"
U-L51		x 1/16"
U-L52		x 3/32"
U-L53		x 1/8"
U-L54		x 3/16"
U-L55		x 1/4"
U-L56		x 3/8"
U-L57		x 1/2"

36" BLOCK BALSA

U-L120	1"	x 1"
U-L121		x 1½"
U-L122		x 2"
U-L124		x 3"
U-L140	2"	x 2"
U-L142		x 3"
U-L143		x 4"
U-L160	3"	x 3"
U-L161		x 4"

36" BALSA DOWEL

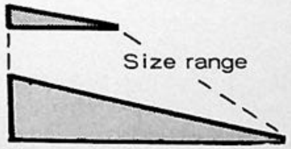
U-L620	3/16" dia
U-L630	1/4" "
U-L640	5/16" "
U-L650	3/8" "
U-L660	1/2" "
U-L670	5/8" "
U-L680	3/4" "
U-L690	1" "



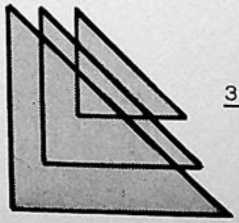
36" LEADING EDGE

U-L320	1/4"	x 1/4"
U-L330	3/8"	x 3/8"
U-L340	1/2"	x 1/2"
U-L350	3/4"	x 3/4"
U-L360	1"	x 1"

36" TRAILING EDGE BALSA



U-L421	1/8"	x 1/2"
U-L430	3/16"	x 1/2"
U-L431		x 3/4"
U-L440	1/4"	x 3/4"
U-L441		x 1"
U-L450	5/16"	x 1¼"

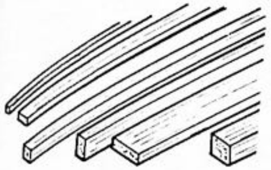


36" BALSA TRIANGLE SECTION

U-L540	1/2"	x 1/2"
U-L560	3/4"	x 3/4"
U-L570	1"	x 1"

OBECHI SPRUCE/HEMLOCK

OBECHI



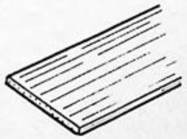
OBECHI is a West African hardwood with a consistent density of about 24lb per cu.ft. By comparison, the density of balsa can vary from 6 to 16lb per cu. ft. Obechi, therefore, is about twice the weight of medium density balsa, and about twice as strong. It is, however, rather more brittle than balsa, and so is not regarded as a direct substitute.

Main use of obechi is for ship modelling. Decks, frames, etc. can be cut from obechi sheet. Thicker obechi sheet can also be laminated for 'bread-and-butter' hull construction, after first cutting to shape. Thin obechi sheet can be cut with a modelling knife, but a fretsaw or padsaw is preferred. Obechi can be shaped by planing.

Obechi strip is widely used for stringers and other longitudinal members in built-up hulls, planking, secondary spars, etc. It can also be used on aircraft for spars, although spruce or hemlock is a preferred material in this case. Obechi is best cut to length with a razor saw.

SOLARBO
36" SHEET OBECHI

U-OB31	3"	× 1/16"
U-OB32		× 3/32"
U-OB33		× 1/8"
U-OB34		× 3/16"
U-OB35		× 1/4"



SOLARBO
36" OBECHI STRIP

U-OB220	1/16"	× 1/16"
U-OB221		× 1/8"
U-OB223		× 1/4"
U-OB230	3/32"	× 3/32"
U-OB240	1/8"	× 1/8"
U-OB242		× 1/4"
U-OB243		× 3/8"
U-OB244		× 1/2"
U-OB250	3/16"	× 3/16"
U-OB253		× 1/2"
U-OB260	1/4"	× 1/4"
U-OB262		× 1/2"
U-OB270	3/8"	× 3/8"
U-OB271		× 1/2"
U-OB280	1/2"	× 1/2"

SPRUCE and HEMLOCK

Spruce is a straight-grained softwood, slightly heavier than obechi and stronger overall. The strength/weight ratio of spruce strip is directly comparable with balsa. Spruce, however, is a timber in limited supply. A comparable wood is hemlock, which may be supplied instead of spruce.

Spruce strip is excellent for strong spars in aircraft construction; also for spars, masts, stringers and chines in model boat construction. A particular advantage is the ease with which spruce strip can be bent into curves without splitting. Moderate bends can be made with the wood dry. For more severe bends the strip should first be soaked in water, or steamed.

Spruce sheet is generally regarded as a 'superior' alternative to obechi sheet. It can also be cut to smaller widths for planking, etc.

Spruce carves and works easily, and also nails, screws or glues well. It can be sanded to a really fine finish.

SOLARBO 36" SHEET
SPRUCE/HEMLOCK

U-SP31	3"	× 1/16"
U-SP32		× 3/32"
U-SP33		× 1/8"
U-SP34		× 3/16"
U-SP35		× 1/4"

SOLARBO 36" STRIP
SPRUCE/HEMLOCK

U-SP220	1/16"	× 1/16"
U-SP221		× 1/8"
U-SP223		× 1/4"
U-SP230	3/32"	× 3/32"
U-SP240	1/8"	× 1/8"
U-SP242		× 1/4"
U-SP243		× 3/8"
U-SP244		× 1/2"
U-SP250	3/16"	× 3/16"
U-SP253		× 1/2"
U-SP260	1/4"	× 1/4"
U-SP262		× 1/2"
U-SP270	3/8"	× 3/8"
U-SP271		× 1/2"
U-SP280	1/2"	× 1/2"

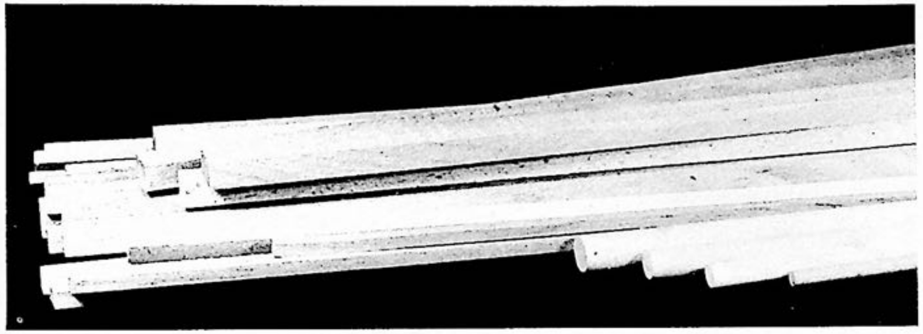
MILLIMETRE EQUIVALENTS

Inches (actual)	3	4	5	6	7	8	9	10	12	15	20	24	30	36
mm (nominal)	75	100	125	150	175	200	225	250	300	375	500	610	750	915

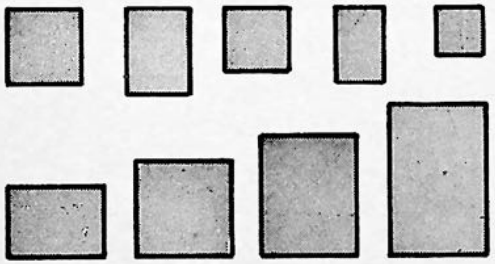
INCH EQUIVALENTS

mm (actual)	25	50	75 or 80	100	150	200	250	300	400	500	1000
Inches (nominal)	1	2	3	4	6	7½	10	12	15	20	40

ENGINE BEARERS DOWEL, PLY

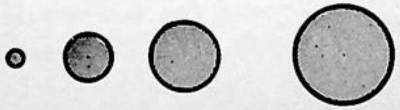


ENGINE BEARERS have to do a vital job. They have to be STIFF to withstand engine vibration without flexing and TOUGH to take shocks. The two factors that govern stiffness are size or cross-sectional area of the bearer, and the depth. The bigger the sectional area the better using a square cross-section. If you want to save bulk and weight, use a rectangular section to give good depth of bearer. The width of section must be at least the width of the mounting lugs. Then you must use the right wood. Hard, tough wood with a close grain. All RIPMAX bearer sections are cut from the finest selected 'hard' hardwood. The right stock for the job. As a final tip - we particularly recommend the use of epoxy adhesive for gluing bearers in place. This will give a really strong joint - fully fuelproof.



18" RIPMAX ENGINE BEARERS

U-EB1	1/4" x 1/4"
U-EB2	1/4" x 3/8"
U-EB11	5/16" x 5/16"
U-EB12	5/16" x 7/16"
U-EB21	3/8" x 3/8"
U-EB22	3/8" x 1/2"
U-EB31	1/2" x 1/2"
U-EB32	1/2" x 5/8"
U-EB33	1/2" x 3/4"



36" RIPMAX BIRCH DOWEL

U-BD1	1/16" dia	U-BD2	1/8" dia
U-BD3	3/16" dia	U-BD4	1/4" dia
U-BD5	5/16" dia	U-BD6	3/8" dia
U-BD7	1/2" dia	U-BD8	5/8" dia

PLYWOOD...

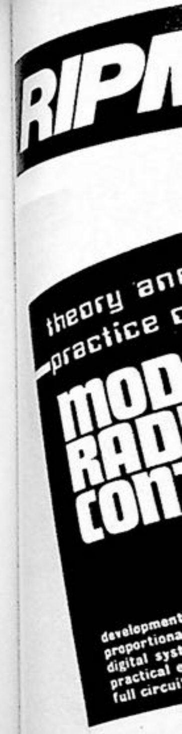
Most modern plywoods are resin-bonded, but aircraft and marine applications require much more than just 'resin-bonded' ply. Veneers need to be selected carefully for uniformity and quality, particularly for thinner plies. Manufacturing technique has to be of precision standard throughout - down to final sanding of the surfaces. These are special features of RIPMAX resin bonded ply which rates as 'aircraft' or 'marine' standard. Sizes vary from 1/4" (6.5mm) down to 1/64" (0.4mm)

INCH FRACTION/MILLIMETRE CONVERSIONS

1/32"	=	.79mm
1/16"	=	1.59mm
3/32"	=	2.38mm
1/8"	=	3.18mm
5/32"	=	3.97mm
3/16"	=	4.76mm
7/32"	=	5.56mm
1/4"	=	6.35mm
9/32"	=	7.15mm
5/16"	=	7.94mm
11/32"	=	8.73mm
3/8"	=	9.53mm
13/32"	=	10.32mm
7/16"	=	11.11mm
15/32"	=	11.91mm
1/2"	=	12.70mm
17/32"	=	13.49mm
9/16"	=	14.29mm
19/32"	=	15.08mm
5/8"	=	15.88mm
21/32"	=	16.67mm
11/16"	=	17.46mm
23/32"	=	18.26mm
3/4"	=	19.05mm
25/32"	=	19.84mm
13/16"	=	20.64mm
27/32"	=	21.43mm
7/8"	=	22.23mm
29/32"	=	23.02mm
15/16"	=	23.81mm
31/32"	=	24.61mm

RIPMAX RESIN BONDED PLYWOOD

	1/64" PLYWOOD (0.4mm)
U-PW101	1 ft x 1 ft
U-PW102	2 ft x 1 ft
U-PW103	3 ft x 1 ft
U-PW104	4 ft x 1 ft
U-PW108	4 ft x 2 ft
	1/32" PLYWOOD (0.8mm)
U-PW201	1 ft x 1 ft
U-PW202	2 ft x 1 ft
U-PW203	3 ft x 1 ft
U-PW204	4 ft x 1 ft
U-PW208	4 ft x 2 ft
	1/16" PLYWOOD (1.5mm)
U-PW301	1 ft x 1 ft
U-PW302	2 ft x 1 ft
U-PW303	3 ft x 1 ft
U-PW304	4 ft x 1 ft
U-PW308	4 ft x 2 ft
	1/8" PLYWOOD (4.0mm)
U-PW401	1 ft x 1 ft
U-PW402	2 ft x 1 ft
U-PW403	3 ft x 1 ft
U-PW404	4 ft x 1 ft
U-PW408	4 ft x 2 ft
	1/4" PLYWOOD (6.5mm)
U-PW501	1ft x 1 ft
U-PW502	2 ft x 1 ft
U-PW503	3 ft x 1 ft
U-PW504	4 ft x 1 ft
U-PW508	4 ft x 2 ft



THE NEW PRO
Latest edition
proportional rad
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book of proporti
LOW COST PRO
Gen book on act
single-channel
including Gall
INTRODUCTION
A complete gui
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MODEL RADIO
The only book
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RIPMAX

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resin-bonded, but aircraft and marine e than just 'resin-bonded' ply. Veneers or uniformity and quality, particularly for echnique has to be of precision standard ding of the surfaces. These are special ed ply which rates as 'aircraft' or 'marine' 4" (6.5mm) down to 1/64" (0.4mm)

RIPMAX RESIN BONDED PLYWOOD

	1/64" PLYWOOD (0.
U-PW101	1 ft x 1 ft
U-PW102	2 ft x 1 ft
U-PW103	3 ft x 1 ft
U-PW104	4 ft x 1 ft
U-PW108	4 ft x 2 ft
	1/32" PLYWOOD (0.
U-PW201	1 ft x 1 ft
U-PW202	2 ft x 1 ft
U-PW203	3 ft x 1 ft
U-PW204	4 ft x 1 ft
U-PW208	4 ft x 2 ft
	1/16" PLYWOOD (1.
U-PW301	1 ft x 1 ft
U-PW302	2 ft x 1 ft
U-PW303	3 ft x 1 ft
U-PW304	4 ft x 1 ft
U-PW308	4 ft x 2 ft
	1/8" PLYWOOD (4.
U-PW401	1 ft x 1 ft
U-PW402	2 ft x 1 ft
U-PW403	3 ft x 1 ft
U-PW404	4 ft x 1 ft
U-PW408	4 ft x 2 ft
	1/4" PLYWOOD (6.
U-PW501	1ft x 1 ft
U-PW502	2 ft x 1 ft
U-PW503	3 ft x 1 ft
U-PW504	4 ft x 1 ft
U-PW508	4 ft x 2 ft

RIPMAX

PUBLICATIONS

THE NEW PROPO BOOK

Latest edition of this standard reference to proportional radio control installations...linkages ...control surfaces ... equipment selection ... maintenance and trouble-shooting. The definitive book of proportional radio control.

LOW COST PROPORTIONAL

Gen book on actuators, circuits, switchers, etc. for single-channel 'pulse proportional' systems - including Galloping Ghost and its variants.

INTRODUCTION TO SINGLE R/C

A complete guide to single-channel aircraft radio control installations and operation... plus pictorial instructions on building a suitable model.

MODEL RADIO CONTROL

The only book of its kind which deals comprehensively with the theory and practice of proportional radio control. With practical examples and working circuit details.

RM SPITFIRE BOOK

Factual book for modellers about the full size aircraft.

SKILL AND DEVOTION

The story of aircraft as seen by a World War I fighter pilot.

RM PLANBOOK

Current list of full size model plans - produced and published by Radio Modeller magazine.

RADIO CONTROL SOARING

New 260 page book all about radio controlled model gliders and sailplanes - for beginners and experts. Over 200 line and photo illustrations.

RADIO MODELLER PUBLICATIONS

W-RM1	RM PROPO BOOK
W-RM2	LOW COST PROPORTIONAL
W-RM3	INTRODUCTION TO SINGLE R/C
W-RM4	MODEL RADIO CONTROL
W-RM6	RM SPITFIRE BOOK
W-RM7	SKILL & DEVOTION
W-RM8	RM PLANBOOK
W-RM9	RADIO CONTROL SOARING

CATALOGUES

W-G27FS/3	GRAUPNER 27FS MAIN CATALOGUE
W-GFSP	GRAUPNER FSP MINI CATALOGUE
W-U/MK12	SCHUCO CATALOGUE WITH ENGLISH INSERT
W-RMH1	RIPMAX MODELLERS' HANDBOOK

INSTRUCTION BOOKLETS

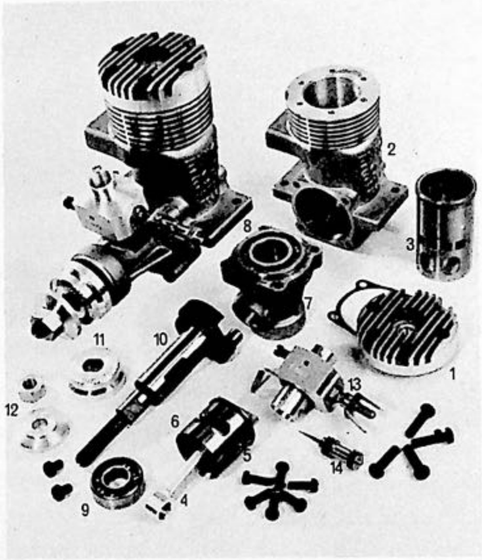
W-MRL01	DIGIMAC 1 + 1 INSTRUCTION BOOKLET
W-MRL02	DIGIMAC 2 & 3 INSTRUCTION BOOKLET
W-MRL04	DIGIMAC 4 & 6 INSTRUCTION BOOKLET
W-FML1	'M' SERIES FUTABA BOOKLET

ENYA ENGINE SPARES

Engine components are readily identified by name, but for the purpose of spares stocking and ordering, each part is given an individual coding description. The exploded photo and key of a typical ENYA engine given here will help identify components, if in doubt. Remember, though, individual engines may differ in detail. Note also that although piston and cylinder (liner) are shown as separate items in the photo, some are only available as matched cylinder/piston assemblies.

********* ENYA 09 III & 15 III SPARES *******

PART DESCRIPTION	09 III	15 III
Cylinder Head	X-EY11G	X-EY11J
Crankcase (aircooled)	X-EY13G	X-EY13J
" (marine)	X-EY14G	X-EY14J
Cylinder/Piston Assy	X-EY15G	X-EY15J
Conrod	X-EY19G	X-EY19J
Gudgeon Pin	X-EY20G	X-EY20J
Front Housing	X-EY21G	X-EY21J
Crankshaft	X-EY24G	X-EY24J
Prop Driver	X-EY25G	X-EY25J
Prop Nut & Washer	X-EY27G	X-EY27J
Screw Set	X-EY28G	X-EY28G
Gasket Set	X-EY29G	X-EY29J
Needle Valve Assy (std)	EY31G	EY31J
Needle only (std)	EY32G	EY32J
Spraybar (std)	EY33G	EY33J
Venturi Set	X-EY34G	X-EY34J
R/C Carb Complete	EY39G	EY39J
Carb Body	X-EY40G	X-EY40J
Carb Barrel	X-EY41G	X-EY41J
Lever & Screw	X-EY42G	X-EY42G
Needle Valve Assy (R/C)	EY43G	EY43G
Needle only (R/C)	EY44G	EY44G
Spraybar (R/C)	EY45G	EY45G
Carb Screw & Spring Set	X-EY46G	X-EY46G
Silencer Strap & Screws	X-EY49G	X-EY49J
Waterjacket Nipple	X-EY50G	X-EY50G



KEY...

1. - Cylinder Head.
2. - Crankcase Unit
3. - Cylinder (Liner)
4. - Con Rod
5. - Gudgeon Pin
6. - Piston
7. - Front Housing & Bearings
8. - Rear Ballrace
9. - Front Ballrace
10. - Crankshaft
11. - Prop Driver
12. - Prop Nut & Washer
13. - R/C Carburettor
14. - Needle only

********** ENYA 19 V & 19 VBB SPARES *********

PART DESCRIPTION	19 V	19 VBB
Cylinder Head	X-EY11M	X-EY11N
" " (car type)	—	X-EY12N
Crankcase (aircooled)	X-EY13M	X-EY13N
" (marine)	X-EY14M	X-EY14N
Cylinder/Piston Assy	X-EY15M	X-EY15M
Conrod	X-EY19M	X-EY19M
Gudgeon Pin	X-EY20M	X-EY20M
Front Housing & Bearings	X-EY21M	X-EY21N
Rear Ballrace	—	X-EY22N
Front Ballrace	—	X-EY23N
Crankshaft	X-EY24M	X-EY24N
Prop Driver	X-EY25M	X-EY25N
" " Allen Key	—	X-EY26N
Prop Nut & Washer	X-EY27J	X-EY27N
Screw Set	X-EY28M	X-EY28N
Gasket Set	X-EY29M	X-EY29N
Needle Valve Assy (std)	EY31J	EY31N
Needle only (std)	EY32J	EY32N
Spraybar (std)	EY33J	EY33N
Venturi Set	X-EY34J	X-EY34N
R/C Carb complete	EY39M	EY39N
Carb Body	X-EY40J	X-EY40N
" Barrel	X-EY41M	X-EY41N
Lever & Screw	X-EY42G	X-EY42G
Needle Valve Assy (R/C)	EY43G	EY43G
Needle only (R/C)	EY44G	EY44G
Spraybar (R/C)	EY45G	EY45G
Carb Screw & Spring Set	X-EY46G	X-EY46N
Silencer Strap & Screws	X-EY49J	X-EY49J
Water Jacket Nipple	X-EY50G	X-EY50G

ENYA 29 IV, 29 IVBB, ENYA 35 III & 35 IIIBB ENGINE SPARES

PART DESCRIPTION	29 IV	29 IVBB	35 III	35 IIIBB
Cylinder Head (std)	X-EY11P	X-EY11P	X-EY11R	X-EY11R
" " (High Comp)	X-EY12P	X-EY12P	X-EY12R	X-EY12R
Crankcase (aircooled)	X-EY13P	X-EY13Q	X-EY13R	X-EY13S
" (marine)	X-EY14P	X-EY14Q	X-EY14R	X-EY14S
Cylinder/Piston Assy	X-EY15P	X-EY15Q	X-EY15R	X-EY15S
Conrod	X-EY19P	X-EY19P	X-EY19P	X-EY19P
Gudgeon Pin	X-EY20P	X-EY20P	X-EY20R	X-EY20R
Front Housing & Bearings	X-EY21P	X-EY21Q	X-EY21P	X-EY21Q
Rear Ballrace	–	X-EY22Q	–	X-EY22Q
Front Ballrace	–	X-EY23Q	–	X-EY23Q
Crankshaft	X-EY24P	X-EY24Q	X-EY24P	X-EY24Q
Prop Driver	X-EY25P	X-EY25Q	X-EY25P	X-EY25Q
Prop Nut & Washer	X-EY27P	X-EY27Q	X-EY27P	X-EY27Q
Screw Set	X-EY28P	X-EY28Q	X-EY28P	X-EY28Q
Gasket Set	X-EY29P	X-EY29P	X-EY29P	X-EY29P
Pressure Tapping	X-EY30P	X-EY30P	X-EY30P	X-EY30P
Needle Valve Assy (std)	EY31N	EY31N	EY31N	EY31N
Needle only (std)	EY32N	EY32N	EY32N	EY32N
Spraybar (std)	EY33N	EY33N	EY33N	EY33N
Venturi Set	X-EY34P	X-EY34Q	X-EY34P	X-EY34Q
R/C Carb Complete	EY39P	EY39Q	EY39P	EY39Q
Carb Body	X-EY40P	X-EY40Q	X-EY40P	X-EY40Q
Carb Barrel	X-EY41P	X-EY41Q	X-EY41P	X-EY41Q
Lever & Screw	X-EY42P	X-EY42P	X-EY42P	X-EY42P
Needle Valve Assy (R/C)	EY43P	EY43P	EY43P	EY43P
Needle only (R/C)	EY44P	EY44P	EY44P	EY44P
Spraybar (R/C)	EY45P	EY45P	EY45P	EY45P
Carb Screw & Spring Set	X-EY46P	X-EY46P	X-EY46P	X-EY46P
Silencer Strap & Screws	X-EY49P	X-EY49P	X-EY49P	X-EY49P
Water Jacket Nipple	X-EY50P	X-EY50P	X-EY50P	X-EY50P

ENYA 45BB and ENYA 60III SPARES

PART DESCRIPTION	45BB	60 III
Cylinder Head	X-EY11T	X-EY11V
Crankcase (aircooled)	X-EY13T	X-EY13V
" (marine)	X-EY14T	X-EY14V
Cylinder	X-EY16T	X-EY16V
Piston	X-EY17T	X-EY17V
Piston Ring	X-EY18T	X-EY18V
Conrod	X-EY19T	X-EY19V
Gudgeon Pin	X-EY20T	X-EY20V
Front Housing & Bearings	X-EY21T	X-EY21V
Rear Ballrace	X-EY22Q	X-EY22V
Front Ballrace	X-EY23T	X-EY23T
Crankshaft	X-EY24T	X-EY24V
Prop Driver	X-EY25T	X-EY25V
Prop Nut & Washer	X-EY27T	X-EY27T
Screw Set	X-EY28T	X-EY28V
Gasket Set	X-EY29T	X-EY29V
R/C Carb complete	EY39T	EY39V
Carb Body	X-EY40T	X-EY40V }
Carb Barrel	X-EY41T	
Lever & Screw	X-EY42T	X-EY42V
Needle Valve Assy (R/C)	EY43P	EY43V
Needle only (R/C)	EY44P	EY44V
Spraybar (R/C)	EY45P	EY45V
Carb Screw & Spring Set	X-EY46T	X-EY46T
Silencer Strap & Screws	X-EY49P	X-EY49V
Water Jacket Nipple	X-EY50P	X-EY50P

Note: having identified the part required, always quote the appropriate code number when asking for, or ordering, all engine spares.

MERCO
ENGINE SPARES

MERCO

29

35

49

61

MERCO 29 & 35 BLACK STREAK ENGINE SPARES

PART DESCRIPTION	MERCO 29	MERCO 35
Needle Valve Assy (Stunt)	DJ510	DJ510
" " Only (")	DJ511	DJ511
Spray Bar Only (")	DJ512	DJ512
Crankcase Aircooled	X-DJ513	X-DJ613
Crankcase Marine	X-DJ514	X-DJ614
Crankshaft	X-DJ515	X-DJ515
Cylinder/Piston Assy	X-DJ516	X-DJ616
Conrod	X-DJ520	X-DJ520
Gudgeon Pin	X-DJ521	X-DJ621
Cylinder Head	X-DJ524	X-DJ624
Backplate	X-DJ526	X-DJ526
Prop Driver & Collet	X-DJ527	X-DJ527
Prop Nut & Washer	X-DJ529	X-DJ529
Stunt Venturi	X-DJ530	X-DJ530
Screw & Gasket Set	X-DJ531	X-DJ631

BLACK STREAK PLASTIC THROTTLE SPARES

PART DESCRIPTION	29 & 35	49 & 61
Needle Valve Assy	X-DJ550	X-DJ550
" " Only	X-DJ551	X-DJ551
" Guide Only	X-DJ552	X-DJ552
Body	X-DJ553	X-DJ853
Barrel with Lever & Jet	X-DJ554	X-DJ854
" Pin, Ball & Spring	X-DJ555	X-DJ555
Throttle Stop Screw & Spring	X-DJ556	X-DJ556
End Cap with Fuel Nipple	X-DJ557	X-DJ557
Mixture Arm	X-DJ558	X-DJ558
Swash Plate	X-DJ559	X-DJ559
'O' Ring with Bush & Spring	X-DJ560	X-DJ560
Plain End Cap	X-DJ561	X-DJ561
Set Carb Screws	X-DJ562	X-DJ562
Pair Carb Retaining Screws	X-DJ563	X-DJ863
Complete Throttle	X-DJ51	X-DJ52

MERCO 49 & 61 BLACK STREAK ENGINE SPARES

PART DESCRIPTION	MERCO 49	MERCO 61 SERIES 3	MERCO 61 MARK 4
Crankcase	X-DJ813	X-DJ913	X-DJ913A
Crankshaft	X-DJ815	X-DJ915	X-DJ915A
Cylinder	X-DJ817	X-DJ917	X-DJ917A
Piston only	X-DJ818	X-DJ918	X-DJ918A
" Ring	X-DJ819	X-DJ919	X-DJ919
Con Rod	X-DJ820	X-DJ820	X-DJ820
Gudgeon Pin	X-DJ821	X-DJ921	X-DJ921
Front Ball Race	X-DJ822	X-DJ822	X-DJ822
Rear " "	X-DJ823	X-DJ823	X-DJ823
Cylinder Head	X-DJ824	X-DJ924	X-DJ924A
" Fins	X-DJ825	X-DJ925	X-DJ925
Back Plate	X-DJ826	X-DJ826	X-DJ826
Prop Driver & Collet	X-DJ827	X-DJ827	X-DJ827
Prop Nut & Washer	X-DJ829	X-DJ829	X-DJ929A
Screw & Gasket Set	X-DJ831	X-DJ931	X-DJ931

MK4 MERCO 49 Parts as previous model except as shown below

Crankshaft	X-DJ815A
Cylinder Head	X-DJ824A
Prop Nut & Washer	X-DJ829A

BLACK STREAK METAL THROTTLE SPARES

PART DESCRIPTION	29/35	49/61	49/61 MK4
Needle Valve Assy	DJ650	DJ650	DJ650
" " Only	DJ651	DJ651	DJ651
Spray Bar Only	DJ652	DJ652	DJ652
Carb Body	X-DJ653	X-DJ953	X-DJ953A
" Barrel & Lever	X-DJ654	X-DJ954	X-DJ954A
" " Spring	X-DJ655	X-DJ655	X-DJ655
Throttle Stop Screw & Spring	X-DJ656	X-DJ656	X-DJ656
Idling Screw & Spring	X-DJ657	X-DJ657	X-DJ657
Barrel Screw & Washer	X-DJ662	X-DJ662	X-DJ662
Retaining Grubscrews	X-DJ663	X-DJ663	X-DJ663

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jor engine components are the sam
er is fitted with a contra-piston
Davies Charlton diesels are also fi
eed for flick-starting with the finge
case are also available for all moc

ART DESCRIPTION

DA

eedle Valve Assy
" " only
pray Bar
rankcase
" End Cover
rankshaft
iner/Piston Assy
onrod
udgeon Pin
ylinder Head
omp Screw
" " Stop Pin
riving Hub
Propeller Nut (or Bolt)
" Washer
Spinner
" Tommy Bar
Fuel Tank
" " Bolts (per set)
Gasket Set
Quickstart Spring
" Cam
Marine Cylinder Head

RIPMAX

ENGINE SPARES DC

Major engine components are the same for diesels as for glow motors, except that the cylinder is fitted with a contra-piston and compression-adjusting screw in the cylinder head. Davies Charlton diesels are also fitted with a cam-action QUICKSTART, eliminating the need for flick-starting with the finger. Matching fuel tanks bolting to the rear of the crankcase are also available for all models, except the RAPIER.

PART DESCRIPTION	DART	MERLIN & S/M	SPITFIRE	SABRE
Needle Valve Assy	DE90	DE90	DE90	DE90
" " only	DE91	DE91	DE91	DE91
Spray Bar	DE92	DE92	DE92	DE92
Crankcase	X-DE501	X-DE601	X-DE801	X-DE901
" End Cover	X-DE502	X-DE602	X-DE802	X-DE902
Crankshaft	X-DE503	X-DE603	X-DE803	X-DE903
Liner/Piston Assy	X-DE504	X-DE604	X-DE804	X-DE904
Conrod	X-DE505	X-DE605	X-DE805	X-DE905
Gudgeon Pin	X-DE506	X-DE606	X-DE806	X-DE906
Cylinder Head	X-DE507	X-DE607	X-DE807	X-DE907
Comp Screw	X-DE508	X-DE608	X-DE808	X-DE908
" " Stop Pin	X-DE509	X-DE609	X-DE809	X-DE909
Driving Hub	X-DE510	X-DE610	X-DE810	X-DE910
Propeller Nut (or Bolt)	X-DE511	X-DE611	X-DE811	X-DE911
" Washer	X-DE512	X-DE612	X-DE812	X-DE912
Spinner	X-DE513	X-DE613	X-DE813	X-DE913
" Tommy Bar	X-DE514	X-DE614	X-DE814	X-DE914
Fuel Tank	X-DE515	X-DE615	X-DE815	X-DE915
" " Bolts (per set)	X-DE516	X-DE616	X-DE816	X-DE916
Gasket Set	X-DE517	X-DE617	X-DE817	X-DE917
Quickstart Spring	X-DE518	X-DE618	X-DE818	X-DE918
" Cam	X-DE519	X-DE619	X-DE819	X-DE919
Marine Cylinder Head	DE55	DE56	DE58	DE59

PART DESCRIPTION	WASP	RAPIER
Needle Valve Assy	DE97	DE100
" " Only	DE98	DE101
Spraybar	DE99	DE102
R/C Throttle	—	DE110
R/C Needle Valve only	—	DE111
R/C Spraybar	—	DE112
Crankcase	X-DE201	X-DE301
" End Cover	X-DE202	X-DE302
R/C End Cover with Carb Body	—	X-DE402
Crankshaft	X-DE203	X-DE303
Liner/Piston Assy	X-DE204	X-DE304
Conrod	—	X-DE305
Gudgeon Pin	—	X-DE306
Cylinder Head	X-DE207	X-DE307
Comp Screw	—	X-DE308
" " Stop Pin	—	X-DE309
Driving Hub	X-DE210	X-DE310
Propeller Nut (or bolt)	X-DE211	X-DE311
" Washer	X-DE212	X-DE312
Fuel Tank	DE32	—
" " Bolt	X-DE216	—
Gasket Set	X-DE217	X-DE317
Quickstart Spring	X-DE218	—
" Cam	X-DE219	—
Ball Race (each)	—	X-DE320
End Cover Screw Set	—	X-DE321
Marine Cylinder Head	—	DE53

Note: having identified the part required, always quote the appropriate code number when asking for, or ordering, engine spares.

ENGINE SPARES
HP

RIPMAX

********* HP40R & HP40F ENGINE SPARES *********

PART DESCRIPTION	HP40 REAR	HP40 FRONT
Crankshaft	X-HP01C	X-HP01D
Connecting Rod	X-HP02C	X-HP02C
Gudgeon Pin	X-HP03C	X-HP03C
Piston	X-HP04C	X-HP04C
Taper Collet	X-HP05C	X-HP05C
Prop Driver	X-HP06C	X-HP06C
" Nut & Washer	X-HP07C	X-HP07C
Piston Ring	X-HP09C	X-HP09C
Aircooled Crankcase	X-HP10C	X-HP10C
Cylinder Liner	X-HP11C	X-HP11C
" Head (Nitro)	X-HP12C	X-HP12C
" " (Straight)	X-HP13C	X-HP13C
Backplate	-	X-HP14D
Rear Ball Bearing	X-HP15C	X-HP15D
Front " "	X-HP16C	X-HP16C
Complete Screw Set	X-HP17C	X-HP17C
Cylinder Head Shim Set	X-HP36C	X-HP36C
Crankcase Gasket Set	X-HP37C	X-HP37C
" Bearing Housing	X-HP40C	X-HP40D
Pressure Nipple	X-HP49C	-
Watercooling Nipple	X-HP51C	X-HP51C
Flywheel	X-HP52C	X-HP52C
" Washer	X-HP54C	X-HP54C
Gudgeon Pin Circlip (pair)	X-HP61C	X-HP61C
Backplate & Disc Valve	X-HP62C	-
Marine Crankcase	X-HP110C	X-HP110C
" Bearing Housing	X-HP140C	X-HP140D

********* HP40 & HP61 SILENCER SPARES *********

PART DESCRIPTION	HP40's	HP61's
Silencer (Venturi)	HP70C	-
" (std)	-	HP70E
" Front	-	X-HP72E
" Baffle Tube	-	X-HP73E
" Clips (pr)	-	X-HP74E
Priming Jet & Nut	X-HP75C	X-HP75C
Silencer Screw	-	X-HP76E
" Body	-	X-HP77E
Angled Extension & Clips	-	HP78E
Pressure Nipple	X-HP79C	X-HP79C
Retaining Bolts (pr)	X-HP80C	-
Flange Gasket (pr)	X-HP81C	-
Exhaust Stub	HP82C	-

********** HP40R & HP40F CARB SPARES **********

PART DESCRIPTION	HP40 REAR	HP40 FRONT
R/C Carb Complete	HP71C	HP71D
Carb Body	X-HP20C	X-HP20D
" Barrel	X-HP21C	X-HP21D
Barrel Spring	-	X-HP22D
Adjusting Screw Set	-	X-HP23D
Throttle Stop Screw & Nut	X-HP23C	-
Lever & Screw	X-HP28C	-
Spray Bar	HP29C	HP29D
Needle Valve only	HP30C	HP30C
" " Assy	HP29/30C	HP29/30D
Fuel Nozzle	X-HP32C	-
Rubber O Ring	X-HP39C	X-HP39C

RIPM

****** HP61R & H

...T DESCRIPTION

ankshaft
nnecting Rod
dgeon Pin
iston
aper Collet
rop Driver
" Nut & Washer
" Spinner Assy
Piston Ring
Aircooled Crankc
Cylinder Liner
" Fins
" Head
Backplate only F
Rear Ball Beari
Front " "
Complete Screw
Cylinder Head S
Crankcase Gaske
Front Housing
" "
Cooling Jacket
Cooling.Water
Flywheel
" Adapt
Marine Front H
Carb Retainin
Gudgeon Pin C
Backplate & R

HP61 SILENCER SPARES ********

	HP40's
)	HP70C
	-
ube	-
r)	-
	-
	X-HP75C
	-
	-
& Clips	-
	X-HP79C
pr)	X-HP80C
pr)	X-HP81C
	HP82C

& HP40F CARB SPARES *********

	HP40 REAR
	HP71C
	X-HP20C
	X-HP21C
	-
	-
et	X-HP23C
rew & Nut	X-HP28C
	HP29C
	HP30C
	HP29/30C
	X-HP32C
	X-HP39C

********* HP61R & HP61F ENGINE SPARES **********

PART DESCRIPTION	HP61 REAR MK3	HP61 FRONT MK2
Crankshaft	X-HP01H	X-HP01G
Connecting Rod	X-HP02E	X-HP02E
Gudgeon Pin	X-HP03E	X-HP03E
Piston	X-HP04E	X-HP04E
Taper Collet	X-HP05E	X-HP05G
Prop Driver	X-HP06E	X-HP06G
" Nut & Washer	-	X-HP07G
" Spinner Assy	X-HP07E	-
Piston Ring	X-HP09E	X-HP09E
Aircooled Crankcase	X-HP10G	X-HP10G
Cylinder Liner	X-HP11E	X-HP11E
" Fins	X-HP12E	X-HP12E
" Head	X-HP13E	X-HP13E
Backplate only Front	-	X-HP14G
Rear Ball Bearing	X-HP15E	X-HP15G
Front " "	X-HP16E	X-HP16G
Complete Screw Set	X-HP17E	X-HP17E
Cylinder Head Shim Set	X-HP36E	X-HP36E
Crankcase Gasket Set	X-HP37E	X-HP37E
Front Housing	X-HP40H	X-HP40G
" " with Bearings	X-HP41H	X-HP41G
Cooling Jacket (marine)	X-HP50E	X-HP50E
Cooling.Water Nipple	X-HP51E	X-HP51E
Flywheel	X-HP52E	X-HP52G
" Adapter	X-HP53E	-
Marine Front Housing	-	X-HP55G
Carb Retaining Nut (marine)	-	X-HP56G
Gudgeon Pin Circlips (pair)	X-HP61E	X-HP61E
Backplate & Rotor Assy	X-HP62E	-

CARBURETTOR SPARES

HP61 REAR

R/C Carb Complete	HP71E
Carb Body	X-HP20E
Carb Barrel	X-HP21E
Barrel Spring	X-HP22E
Adjusting Screw Set	X-HP23D
Spray Bar	HP29D
Needle Valve only	HP30C
Needle Valve Assy	HP29/30D
Rubber O Ring	X-HP39E

HP61 FRONT

R/C Carb Complete	HP71G
Carb Body	X-HP20E
Carb Barrel	X-HP21G
Barrel Spring	X-HP22E
Adjusting Screw Set	X-HP23D
Spray Bar	HP29D
Needle Valve only	HP30C
Needle Valve Assy	HP29/30D
Rubber O Ring	X-HP39E

HP61R & HP61F AFM CARB

AFM Carb Complete	HP71Y
Matched Body & Barrel Assy	X-HP20Y
'O' Ring Set	X-HP22Y
Mixture Lever	X-HP24Y
Circlip Set	X-HP25Y
Control Lever Assy	X-HP27Y
Valve Body with 'O' Rings	HP29Y
Needle Valve only	HP30Y
Mounting 'O' Ring	X-HP39E

ME HERON & SNIPE ENGINE SPARES

PART DESCRIPTION	ME HERON	ME SNIPE
Crankcase	X-ME301	X-ME401
" End Cover	X-ME302	X-ME402
" " Screws	X-ME303	X-ME403
Aircooled Head	X-ME304	X-ME404
Marine "	X-ME305	X-ME405
Gasket Set	X-ME306	X-ME406
Compression Screw	X-ME307	X-ME307
Piston/Liner Assy	X-ME308	X-ME408
Gudgeon Pin	X-ME309	X-ME409
Connecting Rod	X-ME310	X-ME410
Crankshaft	X-ME311	X-ME411
" Driving Hub	X-ME312	X-ME412
" Thread Insert	–	X-ME413
" Spinner Nut	X-ME314	X-ME414
Spinner Tommy Bar	X-ME315	X-ME315
Flywheel	X-ME316	X-ME416
" Nut	X-ME317	X-ME317
Fuel Tank	X-ME318	X-ME318
" " Screw	X-ME319	X-ME319
Venturi	–	X-ME420
" Lock Nut	–	X-ME421
Needle Valve Assy	ME350	ME350
" " Only	ME351	ME351
Spraybar Only	ME352	ME352
R/C Throttle	–	ME46
Carb Lever & Screw	–	X-ME461
" Body	–	X-ME462
" Barrel	–	X-ME463
Airbleed Screw & Spring	–	X-ME465

AUSTRO-WEBRA, HB & STAMO ENGINE SPARES

******** AUSTRO WEBRA 20 ENGINE SPARES

Crankcase	X-AW1016/01
Rear Cover	X-AW1016/02
Piston/Liner Assy	X-AW1016/34
Conrod	X-AW1016/06
Gudgeon Pin	X-AW1016/07
Crankshaft	X-AW1016/08
Cylinder Head	X-AW1016/10
" " Screw Set	X-AW1016/11
Std. Venturi	X-AW1016/13
" Valve Body only	AW1016/14
Prop Driver	X-AW1016/15
Std. Needle Valve only	AW1016/18
Gasket Set	X-AW1016/21
Front or Rear Ballrace	X-AW1016/25B
Rear Cover Screw Set	X-AW1016/26
Spinner Nut	X-AW1111/01
Marine Piston/Liner Assy	X-AW1146
" Flywheel	X-AW1153

********* AUSTRO WEBRA 20 CARB SPARES

R/C Carb Complete	X-AW1017/16
Valve Body only	AW1017/16A
Adjusting Screw Set	X-AW1017/16B
Barrel & Lever	X-AW1017/16C
Carb Body & Lock Nut	X-AW1017/16E
Needle Valve only	AW1017/33
" " Complete	AW1017/NVA

NOTE: Engine spares should always be ordered by part number. To avoid any possibility of error, quote engine make and model, and part description as well.

******** AUSTRO-WEBRA 61 ENGINE SPARES ********

PART DESCRIPTION	61 FRONT	61 REAR
Crankcase	X-AW1024/01	X-AW1024/01
" Rear Cover	X-AW1024/02	-
Cylinder Liner	X-AW1024/03	X-AW1024/03
Piston	X-AW1024/04	X-AW1024/04
" Ring	X-AW1024/04A	X-AW1024/04A
Connecting Rod	X-AW1024/06	X-AW1026/06
Gudgeon Pin	X-AW1024/07	X-AW1024/07
" " Circlips (pr)	X-AW1024/07A	X-AW1024/07A
Crankshaft	X-AW1024/08	X-AW1026/08
Cylinder Head	X-AW1024/10	X-AW1024/10
" " Shim Set	X-AW1024/10A	X-AW1024/10A
" " Screws Set	X-AW1024/11	X-AW1024/11
Prop Driver	X-AW1024/15	X-AW1024/15
" " Key	X-AW1024/15A	X-AW1024/15A
" Washer	X-AW1024/19	X-AW1024/19
" Nut	X-AW1024/20	X-AW1024/20
Gasket Set	X-AW1024/21	X-AW1024/21
Front Housing	X-AW1024/22	X-AW1026/22
Disc Valve complete	-	X-AW1026/23
Rear Ball Bearing	X-AW1024/25F	X-AW1026/25A
Front " "	X-AW1024/25G	X-AW1024/25G
Crankcase Screw Set	X-AW1024/26	X-AW1024/26
Marine Crankcase	X-AW1149	X-AW1149
Flywheel	X-AW1154	X-AW1154

AUSTRO-WEBRA 61 CARB SPARES	61 FRONT & REAR
R/C Carb Complete	X-AW1024/16
Spraybar only	AW1024/16A
Airbleed Screw & Locknut	X-AW1024/16B
Carb Barrel & Lever	X-AW1024/16C
Carb Body	X-AW1024/16E
Mounting 'O'Ring	X-AW1024/16G
" Screw	X-AW1024/16H
Needle only	AW1024/33
Idling Mixture Screw	X-AW1024/33A
Needle Valve Assy	AW1024/NVA

** GRAUPNER HB20 HB61 & STAMO ENGINE SPARES ***

PART DESCRIPTION	HB20	HB61
Prop Nut	X-G1525/1	X-G1531/1
" Washer	X-G1525/2	X-G1531/2
" Driver	X-G1525/3	X-G1531/3
" " Collet	X-G1525/4	X-G1531/4
Standard Crankshaft	X-G1525/5	X-G1531/5
Stamo "	—	X-G1545/5
Crankcase	X-G1525/6	X-G1531/6
Front Housing	X-G1525/7	X-G1531/7
Standard Backplate	—	X-G1531/8
Stamo "	—	X-G1545/8
Con Rod	X-G1525/9	X-G1531/9
Gudgeon Pin	X-G1525/10	X-G1531/10
Cylinder Head	X-G1525/11	X-G1531/11
Gasket Set	X-G1525/12	X-G1531/12
Crankcase Screw Set	X-G1525/13	X-G1531/13
Needle Valve only	G1525/14	G1531/14
Perry Throttle	G1525/15	G1531/15
Carb Retaining Screws	X-G1525/16	X-G1531/16
Cylinder Liner	—	X-G1531/17
Piston Ring	—	X-G1531/18
Piston	—	X-G1531/19
Piston/Liner Set	X-G1525/20	—
Front Ball Bearing	X-G1525/21	X-G1531/21
Rear " "	X-G1525/22	X-G1531/22
Silencer	L-G1525/23	G1531/23
Silencer Screws	X-G1525/24	X-G1531/24
Marine Crankcase	X-G1526/25	X-G1532/25
Water Jacket Gasket	X-G1526/26	X-G1532/26
Flywheel	X-G1526/27	X-G1532/27
Stamo Coupling Bolt	—	X-G1545/40
" Fan Shaft	—	X-G1545/41
" Shaft Bearing	—	X-G1545/42
" Fan Wheel	—	X-G1545/43
" Case Plate	—	X-G1545/44
" Fan Case	—	X-G1545/45
" Case Screws	—	X-G1545/46

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January 1st, 1975
1/0101/75

RIPMAX MODELS

RETAIL PRICE LIST

PRICES QUOTED are recommended retail prices, including VAT. Prices are correct* at the time of going to press, but are subject to change without notice. Your local model shop can advise you on current prices, if necessary. *E & O E

n/p = no price available at time of going to press.
t/d = temporarily discontinued.

Page 9	
A-U351/251	50.90
A-U351/252	12.80
A-U763/382	53.20
A-U763/383	16.40
A-U763/385	39.95
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A-MAV4	6.95
A-MAV5	9.95
Page 12	
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B-RK25	9.40
B-RK22	11.65
B-RK23	14.95
B-RK24	16.50
B-RK30	13.30
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B-RK400	17.60
B-RK401	21.90
B-RK402	19.40
B-RK480	49.60
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B-RK102	13.50
B-RK111	14.50
B-RK112	15.50
B-RK60	11.90
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B-RK200/1	7.95
B-RK201	19.95
B-RK201/1	9.95
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B-RK202	22.95
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B-G4229/4	1.60
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B-U201/231
B-U201/230
B-U201/234
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B-U201/239
B-U201/243
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B-TFRC11
B-TFRC9
B-TFRC10
B-TFRC13
B-TFRC15
B-TFRC14
B-TFRC17
B-TFRC18
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Page 58	
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Page 61	
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E-PC107	0.45
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E-G1316/23/10	0.57
E-G1316/23/12	0.57
E-G1316/23/15	0.57
E-G1316/23/18	0.57
E-G1316/24/12	0.60
E-G1316/25/8	0.64
E-G1316/25/10	0.64
E-G1316/25/12	0.64
E-G1316/25/15	0.64
E-G1316/25/18	0.64
E-G1316/28/15	0.68
E-G1316/28/18	0.68
E-G1316/28/20	0.68
E-G1316/30/15	0.72
E-G1317/23/15L	0.74
E-G1317/25/15L	0.78
E-G160	0.78
E-G161	0.88
E-G4900/11	0.45
E-G1318/23/10	1.10
E-G1318/25/10	1.20
E-G1318/28/18	1.32
E-G1318/28/20	1.32
E-G60/25/15	1.24
E-G60/25/18	1.24
E-G60/28/15	1.35
E-G60/28/18	1.35
E-G60/28/20	1.35
E-G60/30/13	1.42
E-G61/21/10L	1.29
E-G61/23/15L	1.29
E-G61/25/15L	1.32
E-G61/28/15L	1.42
E-G194	0.48
E-G196	0.48

E-G197	0.48
E-G200	0.48
E-G202	0.48
E-G203	0.48
E-G198	0.33
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F-FK44	1.30
F-FK45	1.40
F-FK46	1.50
F-FK47	1.60
F-FK48	1.30
F-FK49	1.40
F-FK50	1.50
F-FK51	1.60
F-FK55	0.65
F-FK56	0.44
F-FK77	0.44
F-FK79	0.86
F-FK80	0.27
F-FK81	0.32
F-FK82	0.38
F-FK97	1.10
F-FK98	1.20
F-FK99	1.30
F-FK100	1.40
F-FK101	1.50
F-FK102	1.60
F-FK97W	1.62
F-FK98W	1.72
F-FK99W	1.82
F-FK100W	1.95
F-FK101W	2.05
F-FK102W	2.15
F-FK103	4.30
F-FK104	4.30
F-FK105	4.30
F-FK3901	21.60
F-FK3904	5.40
F-FK3905	0.65
F-FK3905A	0.65
F-FK3906	6.50
F-FK3907	1.30
F-FK3907A	0.65
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F-G57/1	0.22
F-G57/2	0.30
F-G137	2.95
F-G144	3.00
F-G167	1.60
F-G168	1.60
F-G139	0.40
F-G147	0.85
F-G156	0.60
F-G163/44	0.92

F-G163/51	0.94
F-G163/57	0.98
F-G163/64	1.05
F-G163/70	1.12
F-G163/76	1.20
F-G128	1.52
F-G153	0.84
F-G179	0.35
F-G180	0.40
F-G185/1	0.28
F-G185/2	0.30
F-G185/3	0.32
F-G205	0.45
F-G233	5.80
F-G241	0.28
F-G243/2	0.82
F-G244/3	1.95
F-G234	13.44
F-G45	6.30
F-G235	1.40
F-G358/S	0.95
F-G565/15	0.45
F-G565/2	0.45
F-G565/3	0.45
F-G726	0.78
F-G727	0.48
F-G741	0.45
F-G1397/0	0.48
F-G1397/1	0.55
F-G1397/2	0.65
F-G1397/3	0.75
F-G1397/4	1.00
F-G1397/5	1.75
F-G117/50	0.90
F-G3565	0.42
F-G142	6.55
F-G143/65	2.35
F-G143/75	2.35
F-G150	1.10
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F-IM30/C	0.65
F-IM30/M	0.77
F-IM30/S	0.60
F-IM31	1.50
F-IM32	1.25
F-IM34/S	1.20
F-IM34/L	1.20
F-IM35/S	0.65
F-IM35/M	0.65
F-IM35/L	0.65
F-IM36/1M	0.82
F-IM36/2M	0.90
F-IM36/3M	0.99
F-IM37/S	1.35

F-IM37/M	1.50
F-IM37/MB	0.48
F-TS15	0.28
F-TS20	0.32
F-TS25	0.48
F-TS30	0.64
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F-TS40	0.80
F-TS45	0.96
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F-TS30N	0.80
F-TS35N	0.88
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F-TS55N	1.45
F-TS60N	1.90
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F-MG55	0.90
F-MG60	1.10
F-MG65	1.20
F-MG70	1.50
F-MG75	1.65
F-MG80	1.85
F-MG155	1.14
F-MG160	1.22
F-MG165	1.30
F-MG170	1.45
F-MG175	1.60
F-MG260	1.40
F-MG265	1.65
F-MG270	1.80
F-MG275	1.90
F-MG347	0.76
F-MG350	0.80
F-MG354	0.86
F-MG357	0.95
F-MG360	1.05
F-MG365	1.20
F-MG370	1.48
F-MG375	1.65
F-MG380	1.78
F-AA175	0.69
F-AA200	0.74
F-AA225	0.87
F-AA250	1.07
F-AA275	1.17
F-AA300	1.31
F-AA325	1.46
F-AA350	1.61
F-AA400	1.84
F-AA450	2.18

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F-G163/57	0.98
F-G163/64	1.05
F-G163/70	1.12
F-G163/76	1.20
F-G128	1.52
F-G153	0.84
F-G179	0.35
F-G180	0.40
F-G185/1	0.28
F-G185/2	0.30
F-G185/3	0.32
F-G205	0.45
F-G233	5.80
F-G241	0.28
F-G243/2	0.82
F-G244/3	1.95
F-G234	13.44
F-G45	6.30
F-G235	1.40
F-G358/S	0.95
F-G565/15	0.45
F-G565/2	0.45
F-G565/3	0.45
F-G726	0.78
F-G727	0.48
F-G741	0.45
F-G1397/0	0.48
F-G1397/1	0.55
F-G1397/2	0.65
F-G1397/3	0.75
F-G1397/4	1.00
F-G1397/5	1.75
F-G117/50	0.90
F-G3565	0.42
F-G142	6.55
F-G143/65	2.35
F-G143/75	2.35
F-G150	1.10
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F-IM30/C	0.65
F-IM30/M	0.77
F-IM30/S	0.60
F-IM31	1.50
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F-IM34/L	1.20
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F-IM35/M	0.65
F-IM35/L	0.65
F-IM36/1M	0.82
F-IM36/2M	0.90
F-IM36/3M	0.99
F-IM37/S	1.35
F-IM37/M	1.50
F-IM37/MB	0.48
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F-TS25	0.48
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F-TS45	0.96
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F-TS30N	0.80
F-TS35N	0.88
F-TS40N	1.15
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F-TS50N	1.35
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F-MG65	1.20
F-MG70	1.50
F-MG75	1.65
F-MG80	1.85
F-MG155	1.14
F-MG160	1.22
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F-MG260	1.40
F-MG265	1.65
F-MG270	1.80
F-MG275	1.90
F-MG347	0.76
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F-MG354	0.86
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F-AA275	1.17
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F-AA350	1.61
F-AA400	1.84
F-AA450	2.18
F-AA500	2.67
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F-MG462	1.59
F-MG465	1.69
F-MG470	1.84
F-MG475	1.98
F-MG900	0.82
F-CA20	0.32
F-CA25	0.48
F-CA30	0.64
F-CA35	0.75
F-CA40	0.86
F-CA45	0.96
F-CA50	1.05
F-RA3	0.22
F-RA4	0.26
F-RA5	0.32
F-RA6	0.39
F-RA9	0.20
F-RK202/3	0.49
F-U202/568	1.05
F-U202/570	0.55
F-U202/571	0.80
F-U202/572	0.44
F-U202/754	0.80
F-U202/805	8.60
F-U202/966	0.37
F-U202/967	0.23
F-U202/991	2.25
F-U217/900	2.60
F-U257/925	0.44
F-U745/204	0.44
F-MK10	0.60
F-MK11	0.65
F-MK12	0.70
F-MK13	0.80
F-MK14	1.15
F-MK15	0.55
F-MK16	0.60
F-MK17	0.65
F-MK18	0.80
F-MK29/S	0.55
F-MK29/M	0.60
F-MK30/S	0.95
F-MK30/M	1.10
F-MK30/MW	1.60
F-MK30/L	1.70
F-MK31/D	1.25
F-MK31/C	1.40
F-MK31/A	1.70
F-MK32	0.79
F-MK41G	14.60
F-MK42G	10.30
F-MK48G	13.25
F-MK49G	13.25
F-MK70/B	0.60
F-MK70/C	0.90
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F-IP2	0.24
F-IP3	0.35
F-IP4	0.39
F-IP5	0.44
F-IP6	0.49
F-IP7	0.54
F-IP8	0.59
F-IP12	0.60
F-IP13	0.85
F-IP14	0.92
F-IP15	1.00
F-IP16	1.10
F-IP17	1.18
F-IP18	1.24
F-IP41	1.10
F-IP42	1.20
F-IP51	0.16
F-IP52	0.16
F-IP53	0.16
F-IP58	0.42
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F-KSB6	2.95
F-KSB20	3.15
F-KSB30	2.95
F-SM1	3.70
F-RG1	5.95
F-RG2	8.95
F-RG3	14.95
F-RG3/1	0.55
F-RGPS/1	19.65
F-OA12	0.45
F-EMH1	0.36
F-EMH2	8.90
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G-G51	1.05
G-G52	0.80
G-G53	0.50
G-G54	1.05
G-G115	0.62
G-G141	0.55
G-G145	0.42
G-G146	0.42
G-G742	0.84
G-G3500	0.62
G-G3502	0.38
G-G3503	0.48
G-G3504	0.60
G-G3505	0.72
G-G3508	0.75
G-G3510	0.32
G-G3512	0.38
G-G3523	0.38
G-G3546	0.62
G-G3547	0.90
G-G3563	0.60
G-G3582	1.45
G-G3592	0.58
G-G3601	0.22
G-G3602	0.80
G-G3629	0.75
G-G3630	0.68
G-G3631	1.25
G-G3649	0.22
G-G3650	0.24
G-G3665	0.42
G-G3666	0.15
G-G3668	0.17
G-G3669/5	0.36
G-G3669/7	0.36
G-G3675	0.44
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G-FK1	0.20
G-FK3	0.24
G-FK5	0.24
G-FK6	0.16
G-FK2	0.24
G-FK4	0.32
G-FK9	0.16
G-FK8	0.32
G-FK10	0.40
G-FK12	0.54
G-FK11	0.54
G-FK13	0.54
G-FK16	0.08
G-FK17	0.11
G-FK18	0.14
G-FK14	0.32
G-FK15	0.32
G-FK15/1	0.32
G-FK71	0.65
G-FK72	0.80
G-FK73/1	0.30
G-FK74	0.16
G-FK75	0.16
G-FK76	0.16
G-FK119	0.32
G-FK120	0.24
G-FK121	0.44
G-FK123	0.16
G-FK125	0.16
G-FK126	0.16
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G-MK50/1	0.60
G-MK50/3	0.60
G-MK50/4	0.60
G-MK51	0.30
G-MK52/1	0.44
G-MK52/3	0.48
G-MK52/7	0.52
G-MK54	0.48
G-MK55	0.38
G-MK60	0.60
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G-MK62	0.75
G-MK63	0.75
G-MK71	0.48
G-MK72	0.25
G-MK80/S	0.22
G-MK80/M	0.25
G-MK80/L	0.32
G-IM40	0.22
G-IM41	0.58
G-IM42	0.85
G-IM46	0.34
G-IM47	0.34
G-IM49	0.16
G-IM50	0.32
G-IM51	0.32
G-IP71	0.15
G-IP72	0.17
G-IP81	0.21
G-IP82	0.24
G-IP83	0.13
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G-RA30	0.18
G-RA31	0.18
G-RA33	0.18
G-RA34	0.18
G-RA35	0.21
G-RA39	0.18
G-RA309	0.19
G-RA311	0.12
G-A1021	0.18
G-A1023	0.18
G-A1024	0.18
G-A1025	0.18
G-A1026	0.18
G-OA10	0.45
G-OA11	0.57
G-U202/627	0.16
G-U202/630	0.40
G-U202/650	2.20
G-U202/963	0.55
G-MG950	0.16
G-DC1	0.61

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H-MP53	0.19
H-MP56	0.19½
H-MP57	0.22
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H-MP46	0.19
H-MP47	0.24
H-MP30	0.16
H-MP40	0.22
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H-MP62	0.36
H-AW1193	0.35
H-AW1194	0.35
H-AW1195	0.35
H-AW1195/1	0.35
H-AW1196	0.38
H-AW1196/1	0.38
H-AW1197	0.44
H-AW1197/1	0.44
H-G1382/0	0.24
H-G1382/0A	0.24
H-G1382/1	0.26
H-G1382/1A	0.26
H-G1382/6	0.44
H-G1382/2	0.22
H-G1382/2A	0.22
H-G1382/3	0.30
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H-G1382/4	0.38
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H-G1382/5	0.24
H-G1382/5A	0.24
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H-G1382/7A	0.40
H-G1382/8	0.22
H-G1382/9	0.22
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H-G1382/10	0.40
H-G1382/11	0.28
H-G1382/11A	0.28
H-G451/1	0.20
H-G451/2	0.20
H-G451/3	0.22
H-G451/4	0.22
H-G451/5	0.24
H-G451/6	0.24
H-G451/7	0.26
H-G451/8	0.26
H-G451/9	0.28
H-G451/10	0.28
H-G455/1	0.24
H-G455/2	0.24
H-G455/3	0.26
H-G455/4	0.26
H-G455/5	0.30
H-G455/6	0.30
H-G455/7	0.32
H-G455/8	0.36
H-G455/9	0.32
H-G455/10	0.36
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I-TD6	0.78
I-TD65	0.80
I-TD7	0.82
I-TD8	0.86
I-TD9	0.90
I-TD10	0.94
I-TD11	0.98
I-TD12	1.02
I-TD13	1.06
I-TD14	1.10
I-TD15	1.15
I-TD16	1.20
I-TD17	1.25
I-TD18	1.30
I-TD19	1.36
I-TD20	1.42
I-TE65	0.74
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I-TE10	0.88
I-TE11	0.92
I-TE13	0.99
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I-TG7	0.86
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I-TG10	0.98
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I-TG12	1.06
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I-TG14	1.15
I-TG15	1.20
I-TG16	1.25
I-TG17	1.30
I-TG18	1.36
I-TG19	1.42
I-TG20	1.48
I-PA0	t/d
I-PA1	t/d
I-PA2	t/d
I-PA3	t/d
I-PA4	t/d
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I-MA3	2.40
I-MA5	2.95
I-MA7	3.50
I-MA39	t/d
I-MA40	t/d
I-MA43	0.26
I-MA51	0.82
I-MA52	0.88
I-MA53	0.95
I-MA54	1.05
I-MA55	1.20
I-MA51/1	0.42
I-MA52/1	0.44
I-MA53/1	0.48
I-MA54/1	0.82
I-MA55/1	0.55
I-MA51/2	0.35
I-MA54/2	0.35
I-MA61	t/d
I-MA62	t/d
I-MA63	0.44
I-MA71	0.72
I-MA72	0.84
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I-AC6	0.41
I-AC8	0.37
I-AC12	0.34
I-AC18	0.31
I-AC26	0.29
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I-FS2	0.48
I-FS3	0.40
I-FS5	0.45
I-S18	1.10
I-S580	0.01
I-S581	0.01
I-S585	0.02½
I-BS1	t/d
I-BS2	t/d
I-SHG101	0.27
I-SHG801	1.95
I-SHG802	5.50
I-SHG810	0.30
I-SHG811	0.30
I-SHG812	0.32
I-SHG851	0.95
I-SHG852	1.10
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J-G385	1.10
J-G386	1.85
J-G387	0.55
J-G388	0.06½
J-G389	0.18
J-G390	0.05
J-G391	0.22
I-G357/1	1.70
I-G357/2	1.70
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I-G414	0.48
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I-G415	2.64
I-G416	1.80
I-G419	0.22
I-G420/1	0.35
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I-G474	1.18
I-G493	2.10
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I-G571/1	1.95
I-G571/2	1.95
I-G1227	1.15
I-G1228	0.64
I-G1230	1.08
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I-PK001	0.40
I-PK002	0.40
I-PK004	0.37
I-PK007	0.36
I-PK008	0.33
I-PK010	1.67
I-PK012	1.67
I-PK020	2.00
I-PK022	2.00
I-PK030	2.33
I-PK042	0.65
I-PK047	0.21
I-PK048	0.46
I-PK051	1.25
I-PK058	0.44
I-U206/601	0.80
I-U206/601A	0.10
I-U206/602	0.80
I-U206/602A	0.10
I-AW1168	3.55
I-AW1169	3.40
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J-P2	0.11
J-P3	0.13
J-P4	0.16
J-P5	0.08
J-P6	0.13
J-P7	0.20
J-P8	0.13
J-P9	0.20
J-P10	0.04
J-P11	0.04
J-P12	0.04
J-P13	0.09
J-P14	0.09
J-P15	0.04
J-P16	0.04
J-P20	0.09
J-P21	0.13
J-P22	0.09
J-P23	0.13
J-P25	0.04
J-P26	0.04
J-P27	0.04½
J-P28	0.04½
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J-P30	0.14
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J-G365/3	0.03
J-G365/4	0.03
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J-G366/3	0.04
J-G367/1	0.06
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J-G368/4	0.03½
J-G368/5	0.04
J-G369/1	0.02½

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-G251	0.65
-G252	0.70
-G253	0.70
-G254	0.76
G260	0.69
G261	0.78
G262	0.87
G263	0.95
G1385	0.44
G1393	0.55
G1398	0.80
G1602	8.40

L-G1608	0.60
L-G1628	1.10
L-G1610	1.40
L-G1611	2.40
L-G1615	1.44
L-G1625/1	0.24
L-G1625/2	0.28
L-G1625/3	0.42
L-G1648	0.33
L-G1691	1.45
L-G1629	35.70

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L-FK19	0.32
L-FK20	0.24
L-FK21	0.54
L-FK25	1.50
L-FK26	0.49
L-FK27	1.08
L-FK28	1.13
L-FK29	1.18
L-FK30	1.24
L-FK31	1.30
L-FK33	1.05
L-FK34	1.15
L-FK35	1.25
L-FK36	1.35
L-FK37	1.45
L-FK38	0.98
L-FK39	1.08
L-FK108	7.60
L-FK108A	0.58
L-FK109	0.95
L-FK109A	0.48
L-FK110/0	0.48
L-FK110/1	0.48
L-FK110/2	0.48
L-FK110/3	0.48
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L-FK110/17	0.48
L-FK110/18	0.48
L-FK111	18.95
L-FK112	0.95
L-FK113	1.70
L-FK114	0.95
L-FK115	0.48
L-FK116	0.48
L-FK117	2.85
L-FK118	4.80
L-FK111/A	5.40
L-FK111/B	1.30
L-FK111/C	6.40
L-FK111/D	0.35
L-FK122	0.27
L-TT05	0.36
L-TT1	0.39
L-TT2	0.42
L-TT4	0.44
L-TT6	0.46
L-TT8	0.48
L-TT10	0.50
L-TT12	0.52
L-IP101	4.25
L-IP111	1.65
L-IP112	1.85
L-SK10	0.52
L-FP6	2.75
L-FP6/1	0.22
L-RA70	2.20
L-RA75	0.44
L-RA95	0.16

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L-IM2	0.78
L-IM4	0.84
L-IM6	0.95
L-IM8	1.00
L-IM10	1.05
L-IM12	1.10
L-IM11	1.10
L-IM20/S	0.95
L-IM20/M	0.95
L-IM22	0.45
L-IM23	0.45
L-IM24	0.30
L-IM25/09	0.24
L-IM25/19	0.24
L-IM25/35	0.24
L-IM25/45	0.24
L-IM25/60	0.24
L-IM26/09	0.24
L-IM26/10	0.24
L-IM26/15	0.24
L-IM26/19	0.24
L-IM26/30	0.24
L-IM26/35	0.24
L-IM26/40	0.24
L-IM26/50	0.24
L-IM26/58	0.24
L-IM26/60F	0.24
L-IM26/60R	0.24
L-IM27	0.24
L-MK2/A	0.55
L-MK2/B	0.55
L-MK2/C	0.55
L-MK2/H	0.62
L-MK3N	0.45
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L-MK4	1.70
L-MK5	5.40
L-MK20	0.80
L-MK21	0.90
L-MK22	0.95
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L-MK24	1.05
L-MK27	1.00
L-OA102	0.60
L-OA104	0.68
L-OA107	0.75
L-OA111	0.90
L-OA114	0.90
L-OA211	0.90
L-OA310	0.75

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L-DP3	0.42
L-DP4	0.42
L-DB550	n/p
L-DB552	0.22
L-DB553	0.25
L-KBK91	0.84
R-U243/327	0.62
L-U216/384	2.15
L-U216/386	3.45
L-U216/411	9.95
L-U217/980	0.44
L-EM2	11.65
L-EM2/1	0.85
L-EM2/2	1.55
L-EM2/3	1.55

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L-U216/430	0.88
L-U217/902	1.07
L-U217/903	1.12
L-U217/904	1.21
L-U217/905	1.28
L-U217/906	1.40
L-U217/907	1.56
L-FG21	0.50
L-FG22	0.50
L-FG31	0.50
L-FG32	0.50
L-FG41	0.50
L-FG42	0.50

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M-EM136P	5.70
M-EM141P	6.45
M-EM145P	8.25
M-EM146P	10.25
M-EM136P/1	1.70
M-EM141P/1	1.80
M-EM250	4.10
M-EM251	5.60
M-EM281	1.25
M-EM282	1.25
M-EM283	1.25
M-EM291	0.12
M-EM292	0.15
M-EM293	0.18
M-EM81	4.30
M-EM84	6.55
M-EM86	9.65
M-EM87	11.90
M-EM89	14.60
M-EM81/1	0.28
M-EM86/1	0.56
M-EM87/1	0.64

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M-EM41	3.85
M-EM50	2.65
M-EM51	5.85
M-EM52	6.45
M-EM55	2.50
M-EM56	5.65
M-EM130	4.05
M-EM131	4.05
M-EM136	3.80
M-EM139	3.60
M-EM141	4.20
M-EM145G	6.25
M-EM146G	8.20
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M-G1725	8.60
M-G1726	5.15
M-G1726/41	1.95
M-G1726/141	2.40
M-G1726/485	2.70
M-G1739	5.15
M-G1770	7.35
M-G3534	2.95

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M-EM005	0.34
M-EM105	0.38
M-EM205	0.44
M-EM305	0.56
M-EM405	0.66
M-EM505	0.78
M-EM605	1.30
M-EM705	1.84
M-EM805	2.60
M-EM005/1	0.12
M-EM205/1	0.12
M-EM405/1	0.12
M-EM10	0.30
M-EM3	0.94
M-EM300	0.87
M-G1719	4.45
M-G1721	1.15
M-G1750	4.40

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N-901	0.04
N-902	0.04
N-905	0.08
N-906	0.08
N-907	0.09
N-908	0.09
N-1901	0.05
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N-1912	0.11
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N-1914	0.16
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N-1916	0.20
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N-1941	0.20
N-1980	0.09
N-1981	0.08
O-ER/SP2	0.09
O-ER/SP11	0.08½
O-ER/HP2	0.12
O-ER/HP7	0.06
O-ER/HP11	0.11½
O-ER/AD4	0.50
O-ER/AD35	0.26
O-ER/126	0.31
O-ER/1289	0.16
O-ER/PP1	0.31
O-ER/PP3	0.17
O-ER/PP4	0.22
O-ER/PP6	0.28
O-ER/PP7	0.33
O-ER/PP9	0.38
O-VPT7/4	2.52
O-VPT7/7	2.82
O-VPT7/9	3.30
O-RV20	t/d
O-RV40	t/d
O-V613/12	7.50

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O-MFB9	3.68
O-3MFB7	7.81
O-G3690(3AX2/F)	8.20

O-G3674(3GX3/F)	13.95
O-KM28	3.95
O-KM64	3.15
O-D2/225TT	1.60
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O-D5/225TT	4.15
O-D6/225TT	5.00
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O-D3/500TT	3.45
O-D4/500TT	4.60
O-D5/500TT	5.75
O-D6/500TT	6.90
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O-D8/500TT	9.20
O-D10/500TT	11.45
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O-D2/225P	1.65
O-D3/225P	2.45
O-D4/225P	3.30
O-D5/225P	4.15
O-D6/225P	4.90
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O-D3/500P	3.45
O-D4/500P	4.60
O-D5/500P	5.75
O-D6/500P	6.80
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O-CH2	5.95
O-CH6	5.95
O-CH246	7.95
O-G3685	11.90
O-G3530	0.62
O-G3685/3A	0.60
O-G3685/3B	0.60
O-G3685/3C	0.60
O-G3685/3D	0.60
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P-FD52M	15.90
P-FD3M	80.00
P-FD53M	17.20
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P-FD4M	89.00
P-FD6M	99.00
P-FD48M	3.60
P-FD56M	22.60
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P-FD124M	5.40
P-FD128M	11.40
P-FD130M	5.80
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P-FD132M	0.70
P-FD135M	0.70
P-FD165M	1.20
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P-FD190M	0.70
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P-FD304	1.50
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P-FD307	1.50
P-FD308	1.50
P-FD309	1.50
P-FD310	1.50
P-FD311	1.50
P-FD312	1.50
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P-G3810	60.60
P-G3811	76.15
P-G3812	89.70
P-G3616	16.40
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P-G3637	2.05
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P-G3662	0.50
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P-G3739	41.05
P-G3742	22.50
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P-G3746	30.80
P-G3748	9.50
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P-G3800	238.80
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P-G3900	99.60
P-G3910	28.80
P-G3920	30.40
P-G3930	4.30
P-G3940	22.10
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P-G3581	3.50
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P-MR50	8.50
P-MR60	10.50
P-MR230	16.00
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P-MR1400	45.75
P-MR1600	61.75
P-MR24	16.50
P-MR26	18.50
P-MR1424	75.00
P-MR1626	93.00
P-MR9	6.00
P-MR10	12.75
P-MR11	6.00
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P-MR14	n/p
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P-AP16	5.25
P-AP17	0.15
P-AP18	0.60
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Q-CFR1	0.10
Q-CFR2	0.10
Q-CFR3	0.10
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Q-CFR6	0.10
Q-CFR10	0.58
Q-OA3	0.33
Q-OA4	0.36
Q-OA6	0.42
Q-OA8	0.49
Q-MK96	0.40
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Q-MC4	0.49
Q-FR13	0.23
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Q-RC45	0.19
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Q-RC57	0.09
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Q-RC71	0.07½
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R-LS56	3.88
R-LS60	2.95
R-LS61	2.95
R-LS61/10	4.20
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R-LS80	4.20
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R-LS56/1	0.55
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R-LS61/3	0.45
R-LS61/4	0.45

R-LS61/5	0.45
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R-WMT8	0.33
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R-W2400DK	7.65
R-W2400/1	0.03
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R-W7135	0.26
R-W6110	0.33
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R-HM1	2.53
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R-HM30	3.25
R-T259	32.50
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R-T229	8.25
R-T600	18.70
R-T400	1.15
R-T406	1.15
R-T408	0.62
R-T432	0.62
R-T409	1.85
R-T571	49.80
R-T573	18.95
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R-T8029	0.70
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R-B014500	0.83
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R-T50/1	0.38
R-U243/371	0.62
R-U243/372	0.62
R-T4	1.60
R-T4/1	0.15

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R-T51/1	0.02½
R-T51/2	0.02½
R-T51/3	0.02½
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R-T52/B	0.03
R-T52/D	0.03
R-T53/R40	0.03½
R-T53/S	0.03½
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R-T53/V	0.03½
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R-X52C & ST	0.92
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R-X75	4.50
R-X77	2.70
R-X79C	5.45
R-X81 & 81C	2.50
R-X82 & 82C	3.15
R-X83 & 83C	4.15
R-X84	7.95
R-X85	11.95
R-X86	9.95
R-X87	13.70
R-X88N	22.50
R-X531C	2.25
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R-X1C & ST	0.43
R-X1MC & ST	0.43
R-X2C & ST	0.58
R-X3C & ST	0.74
R-X4C & ST	0.34
R-X5C & ST	0.88
R-X6C & ST	1.30
R-X8RC	0.22
R-X9RX & C	1.85
R-X66C	0.57

R-X1AS	0.30
R-X2AS	0.36
R-X4AS	0.50
R-X5AS	0.40
R-X6AS	0.54
R-XA	0.11
R-XB	0.11
R-XC	0.11
R-XD	0.11
R-XE	0.11
R-XF	0.11
R-XW	0.11
R-XX	0.11
R-XY	0.11
R-XZ	0.11
R-X4B	0.27
R-X8B	0.34
R-X9B	0.56
R-X10	0.34
R-X11	0.30
R-X11M	0.30
R-X12	0.34
R-X13	0.30
R-X14	0.42
R-X15	0.37
R-X16	0.30
R-X17	0.30
R-X18	0.33
R-X19	0.33
R-X22	0.38
R-X23X	0.38
R-X24	0.33
R-X25	0.38
R-X26	0.30
R-X27	0.30
R-X28	0.38
R-X29	0.22
R-X30	0.22
R-X31	0.27
R-X32	0.27
R-X34C	0.28
R-X35C	0.32
R-X035C	0.36
R-X43R/2	0.79
R-X43R/3	0.79
R-X43R/5	0.79
R-X44R	0.47
R-X44S	0.26
R-X122	0.23
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R-X0C	0.44
R-X9DC	2.85
R-X10DC	2.45
R-X11DC	2.00

R-X12DC	5.20
R-X21DC	0.78
R-X40C	0.98
R-X41C	0.42
R-X42C	0.52
R-X43C	3.40
R-X44C	1.55
R-X45C	0.65
R-X46C	2.00
R-X48C	0.78
R-X50C	2.00
R-X53C	1.40
R-X60C	1.70
R-X60SC	5.25
R-X70C	1.15
R-X321DC	1.75
R-X335C	0.79
R-X339C	0.92
R-X343C	1.55
R-X349C	0.39
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R-X351	2.55
R-X360C	0.52
R-X361C	3.15
R-X365C	1.00
R-X370C	1.80
R-X371NC	1.20
R-X376C	4.20
R-X378C	2.80
R-X380C	0.94
R-X513C	2.85
R-X514C	4.20
R-X515C	0.39
R-X532C	2.40
R-X533C	1.30
R-X1504C	n/p
R-X1505C	n/p
R-X1506C	n/p
R-X1507C	n/p
R-X1508C	n/p
R-X1509C	n/p
R-X1510C	2.90
Page 134	
R-B1	2.30
R-B3	2.95
R-B4	5.70
R-B11	1.95
R-B12	3.15
R-B13	2.20
R-B21	0.38
R-B22	0.38
R-B23	0.38
R-B24	0.38
R-B25	0.38

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R-B53	0.62
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R-B62	0.70
R-B63	0.70
R-B70	0.95
Page 135	
R-BA00	0.11
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R-BA1	0.11
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R-BA3	0.11
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R-BA5	0.13
R-BA6	0.15
R-BA7	0.17
R-BA8	0.21
R-BA9	0.24
R-BA10	0.28
R-BF1	0.22
R-BF2	0.24
R-BF3	0.29
R-BF4	0.35
R-BF5	0.42
R-BF6	0.50
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R-596	0.10
R-598	0.21
R-BSS0	0.32
R-BSS3	0.40
R-BSSL00	0.32
R-BSL0	0.34
R-BSL1	0.36
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R-BSP10	0.55
R-BSP12	0.70
R-BSC1	0.26
R-BSC2	0.32
R-BSC3	0.36
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S-AG19	0.10
S-AG29	0.16
S-AG46	0.21
S-AG1/1	0.24
S-AG1/2	0.24
S-AG1/3	0.24
S-AG1/4	0.24
S-AG1/5	0.24
S-AG1/6	0.18
S-AG4/1	0.54
S-AG4/2	0.54
S-AG4/3	0.54
S-AG4/4	0.54
S-AG4/5	0.54
S-AG4/6	0.37
S-AG160/65	5.30
S-AG1/43	0.17
S-AG4/43	0.35
S-AG10/43	0.54
S-AG20/43	0.90
S-AG40/43	1.54
S-AG160/43	3.45
S-AG1/	0.17
S-AG4/	0.42
S-AG10/	0.74
S-AG20/	1.22
S-AG40/	1.98
S-AG6/	0.72
S-AG16/	1.18
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No. 1 Tinlets	
Colours	0.11
Varnish	0.11
Copper, gold & brass	0.15
No. 2 Tinlets	
Colours	0.24
Varnish	0.24
Gold & copper	0.39
Colour Dopes	
No. 2	0.24
No. 4	0.39
¼ Litre	0.69
S-H102/35	0.20
S-H102/35S	0.20
S-H105/35	0.30
S-H105/35S	0.30
S-H110/35	0.55
S-H110/35S	0.55
S-H180/35	3.80
S-H180/35S	3.80
S-H199/35	7.45
S-H199/35S	7.45
Page 139	
S-H201	0.16
S-H202	0.30
S-H203	0.49
S-H211	0.11
S-H212	0.22
S-H221	0.24
S-H222	0.39
S-H223	0.67
S-H231	0.24
S-H232	0.39
S-H233	0.68
S-H326	0.30
S-H44M	0.11
S-H44MO	0.23
S-H66M	0.11
S-H66L	0.16
S-H66MO	0.25
S-H70	0.14
S-H77M	0.11
S-H77L	0.16
S-TK1	0.49
Page 140	
S-DV10	0.88
S-DV30	0.99
S-DV1	0.99
S-DV40	1.49
S-DV20	1.49
S-DV205	0.60
S-DV206	1.28
S-DV207	3.55
S-DV100	1.20
S-EV701	0.22
S-EV702	0.42
S-EV703	0.51
S-EV704	0.86
S-EV721	0.27
S-EV722	0.41
S-EV723	0.92
S-EV730	0.22
S-A681	0.44
S-A682	0.52
S-BN684	0.31
S-BN685	0.46
S-BN688	0.86
S-BN691	0.60
S-BN692	1.35
S-HA11	0.89
S-HA12	1.85
Page 141	
T-BG1	0.85
T-BG2	1.30
T-BG11	0.56
T-BG12	0.78
T-BG13	1.30
T-BG14	2.11
T-BG18	0.13
T-BG19	0.16
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T-BG21	0.45
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T-BG23	0.18
T-BG27	0.32
T-BG28	0.32
T-BG31	0.21
T-BG48	0.53
T-BG53	0.36
T-BG54	0.53
T-BG64	1.20
T-BG70	1.64
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T-2001	0.10
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T-2003	0.10
T-2004	0.10
T-2005	0.10
T-2006	0.10
T-2007	0.10
T-2008	0.10
T-2009	0.10
T-2011	0.14
T-2012	0.10
T-2004B	0.50
T-BT8	0.10
T-BT10	0.09
T-BT12	0.08
T-BT14	0.08
T-BT16	0.07
T-BT18	0.06
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T-BT332	0.08
T-AT8	0.10
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T-AT14	0.08
T-AT16	0.07
T-AT18	0.06
T-AT20	0.06
T-CT1	0.18
T-CT2	0.25
T-CT3	0.33
T-CT4	0.40
T-CT5	0.48
T-CT6	0.56
T-CT7	0.62
Page 142	
T-RBA	0.08
T-BR25	0.02
T-RB35	0.06
T-RB40	0.09½
T-RB50	0.12
T-RB55	0.18
T-RB65	0.21
T-RB70	0.30
T-RB80	0.35
T-LL70	0.28
T-LL100	0.40
T-HL70	0.38
T-HL100	0.50
T-LT1	0.35
T-LT2	0.35
T-LT3	0.35
T-LT4	0.35
T-LT5	0.35
T-LT6	0.35
T-LT7	0.35
T-LT8	0.35
T-G421	0.30
T-G422	0.32
T-G423	0.35
T-G424	0.44
T-G425	0.54
T-G441	0.30
T-GP320	0.05½
T-GP220	0.05½
T-GP120	0.05½
T-GP80	0.06
T-GP50	0.10½
T-LP320	0.08
T-LP240	0.08
T-LP150	0.08
T-LP80	0.09½
T-MT1	0.08
T-MT2	0.11
T-MT3	0.15
T-H921	0.20
T-H922	0.15
T-RA81	0.15
T-RA83	0.18

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T-NC1	
T-NC2	
T-NC11	
T-NC12	
T-NC21	
T-NC22	
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T-NC32	
T-NC41	
T-NC42	
T-NC51	
T-NC52	
T-NC61	
T-NC62	
T-NC71	
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T-ST88	
T-ST89	
T-ST90	
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T-M6	
T-M11	
T-M12	
T-M13	
T-M14	
T-M15	
T-M16	
T-PT88	
T-PT89	
T-PT90	
T-PT91	
T-PT92	

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T-CT1	J.18
T-CT2	0.25
T-CT3	0.33
T-CT4	0.40
T-CT5	0.48
T-CT6	0.56
T-CT7	0.62
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T-RBA	
T-BR25	0.08
T-RB35	0.02
T-RB40	0.06
T-RB50	0.09½
T-RB55	0.12
T-RB65	0.18
T-RB70	0.21
T-RB80	0.30
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T-LL100	0.28
T-HL70	0.40
T-HL100	0.38
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T-LT3	0.35
T-LT4	0.35
T-LT5	0.35
T-LT6	0.35
T-LT7	0.35
T-LT8	0.35
	0.35
T-G421	0.30
T-G422	0.32
T-G423	0.35
T-G424	0.44
T-G425	0.54
T-G441	0.30
T-GP320	0.05½
T-GP220	0.05½
T-GP120	0.05½
T-GP80	0.06
T-GP50	0.10½
T-LP320	0.08
T-LP240	0.08
T-LP150	0.08
T-LP80	0.09½
T-MT1	0.08
T-MT2	0.11
T-MT3	0.15
T-H921	0.20
T-H922	0.15
T-RA81	0.15
T-RA83	0.18

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T-NC1	0.32
T-NC2	0.90
T-NC11	0.38
T-NC12	1.04
T-NC21	0.38
T-NC22	1.04
T-NC31	0.52
T-NC32	1.45
T-NC41	0.52
T-NC42	1.45
T-NC51	0.52
T-NC52	1.45
T-NC61	0.52
T-NC62	1.45
T-NC71	0.52
T-NC72	1.45
T-NC81	0.52
T-NC82	1.45
Page 144	
T-F1/1-29	0.64
T-F2/1-29	0.85
T-F3/1-29	6.30
T-F1/30-33	0.75
T-F2/30-33	0.95
T-F3/30-33	7.43
T-F10	0.16½
T-ST88	0.28
T-ST89	0.43
T-ST90	0.62
T-ST92	0.46
T-ST94	0.78
T-ST95	1.10
T-ST96	1.30
T-ST97	1.95
T-ST98	2.70
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T-M1	0.04
T-M2	0.05
T-M3	0.05
T-M4	0.05
T-M5	0.05
T-M6	0.05
T-M11	0.05
T-M12	0.06
T-M13	0.06
T-M14	0.06
T-M15	0.06
T-M16	0.06
T-PT88	0.02½
T-PT89	0.03
T-PT90	0.03½
T-PT91	0.05
T-PT92	0.07½

T-PT93	0.09½
T-DR1	0.02½
T-DR2	0.03½
T-DR3	0.04½
T-DR11	0.07
T-DR12	0.15
T-DR13	0.28
T-TP8	0.22
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T-TP12	0.10
T-TP14	0.06
T-TP16	0.04½
T-TP18	0.03
T-TP20	0.02
T-TP22	0.01½
T-TP24	0.01
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U-L220	0.01
U-L221	0.01½
U-L222	0.03
U-L223	0.03½
U-L230	0.02
U-L240	0.03
U-L241	0.03½
U-L242	0.04
U-L243	0.04½
U-L244	0.05
U-L250	0.04
U-L251	0.04
U-L253	0.05½
U-L260	0.05
U-L262	0.06
U-L263	0.10
U-L270	0.06½
U-L280	0.11
U-L283	0.15½
U-L740	0.12
U-L40X	0.28
U-L41X	0.31
U-L42X	0.34
U-L43X	0.40
U-L44X	0.46
U-L45X	0.53
U-L46X	0.60
U-L47X	0.73
U-L50X	0.48
U-L51X	0.51
U-L52X	0.55
U-L53X	0.61
U-L54X	0.66
U-L55X	0.79
U-L56X	0.91
U-L57X	1.15

U-L20	0.08
U-L21	0.09
U-L22	0.09
U-L23	0.10
U-L24	0.12
U-L25	0.14½
U-L26	0.17½
U-L27	0.22
U-L30	0.13
U-L31	0.15½
U-L32	0.16½
U-L33	0.19
U-L34	0.21
U-L35	0.23
U-L36	0.30
U-L37	0.36
U-L40	0.19
U-L41	0.22
U-L42	0.24
U-L43	0.27
U-L44	0.31
U-L45	0.34
U-L46	0.41
U-L47	0.53
U-L50	0.33
U-L51	0.35
U-L52	0.39
U-L53	0.43
U-L54	0.46
U-L55	0.55
U-L56	0.61
U-L57	0.73
U-L120	0.28
U-L121	0.40
U-L122	0.50
U-L124	0.73
U-L140	0.86
U-L142	1.25
U-L143	1.65
U-L160	1.82
U-L161	2.44
U-L620	0.05½
U-L630	0.06½
U-L640	0.09
U-L650	0.10
U-L660	0.13
U-L670	0.18½
U-L680	0.22
U-L690	0.34
U-L320	0.06
U-L330	0.10
U-L340	0.12
U-L350	0.24
U-L360	0.36

U-L421	0.07½
U-L430	0.08
U-L431	0.09
U-L440	0.10
U-L441	0.12
U-L450	0.19
U-L540	0.09
U-L560	0.13
U-L570	0.21
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U-OB31	0.21
U-OB32	0.24
U-OB33	0.26
U-OB34	0.33
U-OB35	0.41
U-OB220	0.03
U-OB221	0.04
U-OB223	0.04½
U-OB230	0.04
U-OB240	0.04½
U-OB242	0.06½
U-OB243	0.08
U-OB244	0.09
U-OB250	0.06½
U-OB253	0.09½
U-OB260	0.09
U-OB262	0.11
U-OB270	0.13
U-OB271	0.15½
U-OB280	0.18½
U-SP31	0.24
U-SP32	0.30
U-SP33	0.33
U-SP34	0.43
U-SP35	0.53
U-SP220	0.03
U-SP221	0.04
U-SP223	0.05½
U-SP230	0.04
U-SP240	0.05½
U-SP242	0.06½
U-SP243	0.07½
U-SP244	0.09
U-SP250	0.07½
U-SP253	0.10½
U-SP260	0.10
U-SP262	0.12
U-SP270	0.16½
U-SP271	0.18½
U-SP280	0.22
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U-EB1	0.05½
U-EB2	0.06

U-EB11	0.06
U-EB12	0.06½
U-EB21	0.06½
U-EB22	0.07
U-EB31	0.07½
U-EB32	0.08½
U-EB33	0.10
U-BD1	0.06½
U-BD2	0.07
U-BD3	0.08
U-BD4	0.09
U-BD5	0.10
U-BD6	0.14
U-BD7	0.22
U-BD8	0.29
U-PW101	0.30
U-PW102	0.60
U-PW103	0.90
U-PW104	1.20
U-PW108	2.40
U-PW201	0.30
U-PW202	0.60
U-PW203	0.90
U-PW204	1.20
U-PW208	2.40
U-PW301	0.34
U-PW302	0.68
U-PW303	1.02
U-PW304	1.35
U-PW308	2.70
U-PW401	0.36
U-PW402	0.72
U-PW403	1.08
U-PW404	1.44
U-PW408	2.85
U-PW501	0.48
U-PW502	0.96
U-PW503	1.44
U-PW504	1.90
U-PW508	3.80
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W-RM1	1.50
W-RM2	1.05
W-RM3	0.25
W-RM4	2.25
W-RM6	0.35
W-RM7	1.50
W-RM8	0.15
W-RM9	2.25
W-G27FS/3	0.75
W-GFSP	0.10
W-U/MK12	0.70
W-RMH1	0.95

W-MRL01	0.05
W-MRL02	0.10
W-MRL04	0.10
W-FML1	0.15
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X-EY11G	0.60
X-EY13G	1.45
X-EY14G	2.65
X-EY15G	1.65
X-EY19G	0.44
X-EY20G	0.30
X-EY21G	1.20
X-EY24G	1.45
X-EY25G	0.25
X-EY27G	0.15
X-EY28G	0.12
X-EY29G	0.10
EY31G	0.65
EY32G	0.28
EY33G	0.38
X-EY34G	0.18
EY39G	2.55
X-EY40G	1.45
X-EY41G	0.75
X-EY42G	0.12
EY43G	1.20
EY44G	0.55
EY45G	0.65
X-EY46G	0.20
X-EY49G	0.25
X-EY50G	0.15
X-EY11J	0.70
X-EY13J	1.90
X-EY14J	3.20
X-EY15J	1.90
X-EY19J	0.55
X-EY20J	0.35
X-EY21J	1.55
X-EY24J	1.70
X-EY25J	0.28
X-EY27J	0.18
X-EY29J	0.15
EY31J	0.85
EY32J	0.47
EY33J	0.42
X-EY34J	0.50
EY39J	2.55
X-EY40J	1.45
X-EY41J	0.75
X-EY49J	0.30
X-EY11M	0.80
X-EY13M	2.25
X-EY14M	3.70
X-EY15M	2.60
X-EY19M	0.65
X-EY20M	0.35
X-EY21M	1.85
X-EY24M	2.00
X-EY25M	0.30
X-EY28M	0.15
X-EY29M	0.18
EY39M	2.55
X-EY41M	0.75
X-EY11N	0.85
X-EY12N	0.85
X-EY13N	2.70
X-EY14N	4.15
X-EY21N	5.60
X-EY22N	1.65
X-EY23N	1.45
X-EY24N	3.30
X-EY25N	0.50
X-EY26N	0.22
X-EY27N	0.22
X-EY28N	0.16
X-EY29N	0.15
EY31N	0.95
EY32N	0.48
EY33N	0.48
X-EY34N	0.60
EY39N	2.85
X-EY40N	1.85
X-EY41N	0.90
X-EY46N	0.25
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X-EY11P	0.95
X-EY12P	0.95
X-EY13P	2.65
X-EY14P	4.25
X-EY15P	3.45
X-EY19P	0.80
X-EY20P	0.44
X-EY21P	2.25
X-EY24P	2.50
X-EY25P	0.35
X-EY27P	0.22
X-EY28P	0.18
X-EY29P	0.18
X-EY30P	0.18
EY31N	0.95
EY32N	0.48
EY33N	0.48
X-EY34P	0.90
EY39P	2.85
X-EY40P	1.90
X-EY41P	0.95
X-EY42P	0.12
EY43P	1.20
EY44P	0.55
EY45P	0.65
X-EY46P	0.25
X-EY49P	0.35
X-EY50P	0.22
X-EY13Q	2.90
X-EY14Q	4.50
X-EY15Q	3.45
X-EY21Q	4.85
X-EY22Q	1.30
X-EY23Q	1.30
X-EY24Q	4.30
X-EY25Q	0.55
X-EY27Q	0.22
X-EY28Q	0.18
X-EY34Q	0.90
EY39Q	2.85
X-EY40Q	1.90
X-EY41Q	0.95
X-EY11R	1.00
X-EY12R	1.00
X-EY13R	2.75
X-EY14R	4.35
X-EY15R	3.70
X-EY20R	0.44
X-EY13S	3.00
X-EY14S	4.65
X-EY15S	3.70
X-EY11T	1.60
X-EY13T	4.05
X-EY14T	6.00
X-EY16T	3.60
X-EY17T	2.75
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X-EY19T	1.35
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X-EY21T	5.50
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X-EY24T	4.40
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X-EY27T	0.25
X-EY28T	0.20
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X-EY42T	0.14
X-EY46T	0.25
X-EY11V	2.35
X-EY13V	4.80
X-EY14V	7.40
X-EY16V	4.40
X-EY17V	3.30
X-EY18V	1.40
X-EY19V	1.60
X-EY20V	0.65
X-EY21V	6.20
X-EY22V	1.30
X-EY24V	5.50
X-EY25V	0.65
X-EY28V	0.22
X-EY29V	0.18
EY39V	6.30
X-EY40V	4.95
X-EY42V	0.25
EY43V	1.35
EY44V	0.68
EY45V	0.68
X-EY49V	0.45
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DJ510	0.74
DJ511	0.37
DJ512	0.37
X-DJ513	3.40
X-DJ514	6.70
X-DJ515	2.75
X-DJ516	3.40
X-DJ520	0.88
X-DJ521	0.48
X-DJ524	1.00
X-DJ526	0.45
X-DJ527	1.00
X-DJ529	0.33
X-DJ530	0.48
X-DJ531	0.48
X-DJ613	3.40
X-DJ614	6.70
X-DJ616	3.40
X-DJ621	0.48
X-DJ624	1.00
X-DJ631	0.48
X-DJ813	4.85
X-DJ815	4.40
X-DJ817	3.10
X-DJ818	2.85
X-DJ819	0.80
X-DJ820	1.75
X-DJ821	0.80
X-DJ822	1.10
X-DJ823	1.30
X-DJ824	3.00
X-DJ825	2.20
X-DJ826	0.70
X-DJ827	1.00
X-DJ829	0.33
X-DJ831	0.48
X-DJ913	4.85
X-DJ915	4.40
X-DJ917	3.10
X-DJ918	2.85
X-DJ919	0.80
X-DJ921	0.80
X-DJ924	3.00
X-DJ925	2.20
X-DJ931	0.48
X-DJ913A	4.85
X-DJ915A	4.40
X-DJ917A	3.10
X-DJ918A	2.85
X-DJ924A	3.00
X-DJ929A	0.33
X-DJ815A	4.40
X-DJ824A	3.00
X-DJ829A	0.33
X-DJ550	0.74
X-DJ551	0.37
X-DJ552	0.37
X-DJ553	1.55
X-DJ554	1.85
X-DJ555	0.33
X-DJ556	0.18
X-DJ557	1.00
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X-DJ559	0.48
X-DJ560	0.60
X-DJ561	0.48
X-DJ562	0.18
X-DJ563	0.11
X-DJ51	5.10
X-DJ853	1.55
X-DJ854	1.85
X-DJ863	0.11
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DJ650	1.45
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DJ652	0.85
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X-DJ656	0.18
X-DJ657	0.50
X-DJ662	0.11
X-DJ663	0.11
X-DJ953	2.00
X-DJ954	1.65
X-DJ953A	2.00
X-DJ954A	1.65
Page 153	
DE90	0.34
DE91	0.14
DE92	0.21
X-DE501	0.87

X-DE502
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X-DE815

X-DE502	0.20
X-DE503	0.88
X-DE504	2.20
X-DE505	0.34
X-DE506	0.04
X-DE507	0.39
X-DE508	0.10
X-DE509	0.06
X-DE510	0.12
X-DE511	0.02
X-DE512	0.02
X-DE513	0.22
X-DE514	0.06
X-DE515	0.14
X-DE516	0.02
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X-DE518	0.18
X-DE519	0.06
DE55	1.74
X-DE601	0.87
X-DE602	0.20
X-DE603	0.69
X-DE604	1.74
X-DE605	0.29
X-DE606	0.04
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X-DE616	0.06
X-DE617	0.04
X-DE618	0.18
X-DE619	0.06
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X-DE801	1.17
X-DE802	0.20
X-DE803	0.69
X-DE804	2.20
X-DE805	0.34
X-DE806	0.04
X-DE807	0.56
X-DE808	0.10
X-DE809	0.06
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X-DE813	0.29
X-DE814	0.06
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X-DE816	0.06
X-DE817	0.04
X-DE818	0.18
X-DE819	0.06
DE58	1.61
X-DE901	1.17
X-DE902	0.20
X-DE903	0.69
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X-DE905	0.34
X-DE906	0.06
X-DE907	0.56
X-DE908	0.10
X-DE909	0.06
X-DE910	0.12
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X-DE912	0.02
X-DE913	0.29
X-DE914	0.06
X-DE915	0.18
X-DE916	0.06
X-DE917	0.04
X-DE918	0.18
X-DE919	0.06
DE59	1.61
DE97	0.43
DE98	0.18
DE99	0.26
X-DE201	1.09
X-DE202	0.25
X-DE203	0.87
X-DE204	1.77
X-DE207	0.40
X-DE210	0.15
X-DE211	0.02
X-DE212	0.02
DE32	0.34
X-DE216	0.02
X-DE217	0.02
X-DE218	0.22
X-DE219	0.07
DE100	0.34
DE101	0.19
DE102	0.19
DE110	0.91
DE111	0.19
DE112	0.19
X-DE301	3.21
X-DE302	1.09
X-DE402	1.82
X-DE303	1.69
X-DE304	3.99
X-DE305	0.55
X-DE306	0.07
X-DE307	1.21
X-DE308	0.12
X-DE309	0.06
X-DE310	0.36
X-DE311	0.07
X-DE312	0.07
X-DE317	0.07
X-DE320	0.79
X-DE321	0.07
DE53	3.27

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X-HP01C	6.20
X-HP02C	1.85
X-HP03C	0.75
X-HP04C	2.95
X-HP05C	0.33
X-HP06C	0.50
X-HP07C	0.28
X-HP09C	1.00
X-HP10C	4.50
X-HP11C	5.80
X-HP12C	2.15
X-HP13C	1.90
X-HP15C	1.55
X-HP16C	1.40
X-HP17C	1.30
X-HP36C	0.36
X-HP37C	0.32
X-HP40C	2.90
X-HP49C	0.28
X-HP51C	0.75
X-HP52C	3.60
X-HP54C	0.24
X-HP61C	0.24
X-HP62C	5.30
X-HP110C	7.70
X-HP140C	2.95
X-HP01D	6.20
X-HP14D	0.70
X-HP15D	1.55
X-HP40D	2.90
X-HP140D	2.95
HP70C	3.70
X-HP75C	0.62
X-HP79C	0.35
X-HP80C	0.30
X-HP81C	0.40
HP82C	1.15
HP70E	4.70
X-HP72E	1.20
X-HP73E	2.05
X-HP74E	0.90
X-HP76E	0.30
X-HP77E	3.10
HP78E	1.40
HP71C	5.30
X-HP20C	2.95
X-HP21C	1.95
X-HP23C	0.30
X-HP28C	0.30
HP29C	1.05
HP30C	0.55
HP29/30C	1.60
X-HP32C	0.44
X-HP39C	0.20
HP71D	5.60
X-HP20D	2.95
X-HP21D	1.95
X-HP22D	0.30
X-HP23D	0.70
HP29D	1.00
HP29/30D	1.55

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X-ME301	1.15
X-ME302	0.18
X-ME303	0.04
X-ME304	0.60
X-ME305	1.55
X-ME306	0.05
X-ME307	0.14
X-ME308	2.10
X-ME309	0.08
X-ME310	0.35
X-ME311	1.00
X-ME312	0.12
X-ME314	0.30
X-ME315	0.08
X-ME316	0.92
X-ME317	0.04
X-ME318	0.16
X-ME319	0.04
ME350	0.32
ME351	0.14
ME352	0.18
X-ME401	1.15
X-ME402	0.18
X-ME403	0.04
X-ME404	0.60
X-ME405	1.55
X-ME406	0.05
X-ME408	2.10
X-ME409	0.08
X-ME410	0.35
X-ME411	1.00
X-ME412	0.12
X-ME413	0.06
X-ME414	0.30
X-ME416	0.92
X-ME420	0.25
X-ME421	0.06
ME46	1.32
X-ME461	0.24
X-ME462	0.80
X-ME463	0.60
X-ME465	0.14
X-HP01H	7.30
X-HP02E	2.10
X-HP03E	1.00
X-HP04E	3.15
X-HP05E	0.30
X-HP06E	0.65
X-HP07E	0.55
X-HP09E	1.15
X-HP10G	5.75
X-HP11E	9.50
X-HP12E	2.30
X-HP13E	1.95
X-HP15E	1.55
X-HP16E	1.25
X-HP17E	1.55
X-HP36E	0.48
X-HP37E	0.36
X-HP40H	3.90
X-HP41H	6.65
X-HP50E	6.60
X-HP51E	0.75
X-HP52E	4.85
X-HP53E	0.85
X-HP61E	0.24
X-HP62E	8.45
X-HP01G	7.30
X-HP05G	0.30
X-HP06G	0.65
X-HP07G	0.30
X-HP14G	0.90
X-HP15G	1.55
X-HP16G	1.25
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X-HP41G	6.65
X-HP52G	4.85
X-HP55G	4.30
X-HP56G	0.44
HP71E	5.60
X-HP20E	2.95
X-HP21E	1.95
X-HP22E	0.30
X-HP23D	0.70
HP29D	1.00
HP30C	0.55
HP29/30D	1.55
X-HP39E	0.20
HP71G	n/p

X-HP21G	1.95
HP71Y	7.80
X-HP20Y	5.95
X-HP22Y	0.45
X-HP24Y	0.40
X-HP25Y	0.45
X-HP27Y	0.30
HP29Y	2.10
HP30Y	0.55
Page 156	
X-AW1016/01	3.95
X-AW1016/02	0.75
X-AW1016/34	5.30
X-AW1016/06	1.05
X-AW1016/07	0.30
X-AW1016/08	3.30
X-AW1016/10	1.50
X-AW1016/11	0.50
X-AW1016/13	0.95
AW1016/14	0.78
X-AW1016/15	0.40
AW1016/18	0.32
X-AW1016/21	0.40
X-AW1016/25B	1.05
X-AW1016/26	0.28
X-AW1111/01	0.48
X-AW1146	6.20
X-AW1153	2.50
X-AW1017/16	3.80
AW1017/16A	0.98
X-AW1017/16B	0.28
X-AW1017/16C	0.90
X-AW1017/16E	2.00
AW1017/33	0.32
AW1017/NVA	1.30
X-AW1024/01	8.40
X-AW1024/02	1.45
X-AW1024/03	6.40
X-AW1024/04	3.90
X-AW1024/04A	1.90
X-AW1024/06	2.15
X-AW1024/07	0.60
X-AW1024/07A	0.20
X-AW1024/08	7.60
X-AW1024/10	2.35
X-AW1024/10A	0.33
X-AW1024/11	0.80
X-AW1024/15	1.40
X-AW1024/15A	0.30
X-AW1024/19	0.25
X-AW1024/20	0.22
X-AW1024/21	0.60
X-AW1024/22	4.80
X-AW1024/25F	1.80
X-AW1024/25G	1.30
X-AW1024/26	0.90
X-AW1149	10.80
X-AW1154	3.70
X-AW1026/06	2.15
X-AW1026/08	7.60
X-AW1026/22	4.80
X-AW1026/23	6.30
X-AW1026/25A	1.80
X-AW1024/16	7.25
AW1024/16A	1.50
X-AW1024/16B	0.50
X-AW1024/16C	2.00
X-AW1024/16E	2.55
X-AW1024/16G	0.40
X-AW1024/16H	0.24
AW1024/33	0.75
X-AW1024/33A	0.90
AW1024/NVA	2.25
X-G1525/1	0.10
X-G1525/2	0.22
X-G1525/3	0.58
X-G1525/4	0.38
X-G1525/5	3.55
X-G1525/6	2.70
X-G1525/7	2.10
X-G1525/9	1.30
X-G1525/10	0.42
X-G1525/11	2.05
X-G1525/12	0.24
X-G1525/13	0.65
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X-G1525/22	1.20
G1525/23	1.95
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X-G1526/25	4.30
X-G1526/26	0.39
X-G1526/27	2.60
X-G1531/1	0.10
X-G1531/2	0.22
X-G1531/3	1.70
X-G1531/4	0.46
X-G1531/5	6.90
X-G1545/5	6.90
X-G1531/6	6.75
X-G1531/7	3.65
X-G1531/8	0.95
X-G1545/8	1.10
X-G1531/9	2.65
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X-G1531/11	4.20
X-G1531/12	0.34
X-G1531/13	0.65
G1531/14	0.45
G1531/15	6.98
X-G1531/16	0.16
X-G1531/17	4.35
X-G1531/18	2.45
X-G1531/19	3.80
X-G1531/21	1.15
X-G1531/22	1.20
G1531/23	4.00
X-G1531/24	0.70
X-G1532/25	8.30
X-G1532/26	0.42
X-G1532/27	3.20
X-G1545/40	0.28
X-G1545/41	2.20
X-G1545/42	1.30
X-G1545/43	4.90
X-G1545/44	0.95
X-G1545/45	2.90
X-G1545/46	0.12

n/p = no price available at time of going to press.
t/d = temporarily discontinued.

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